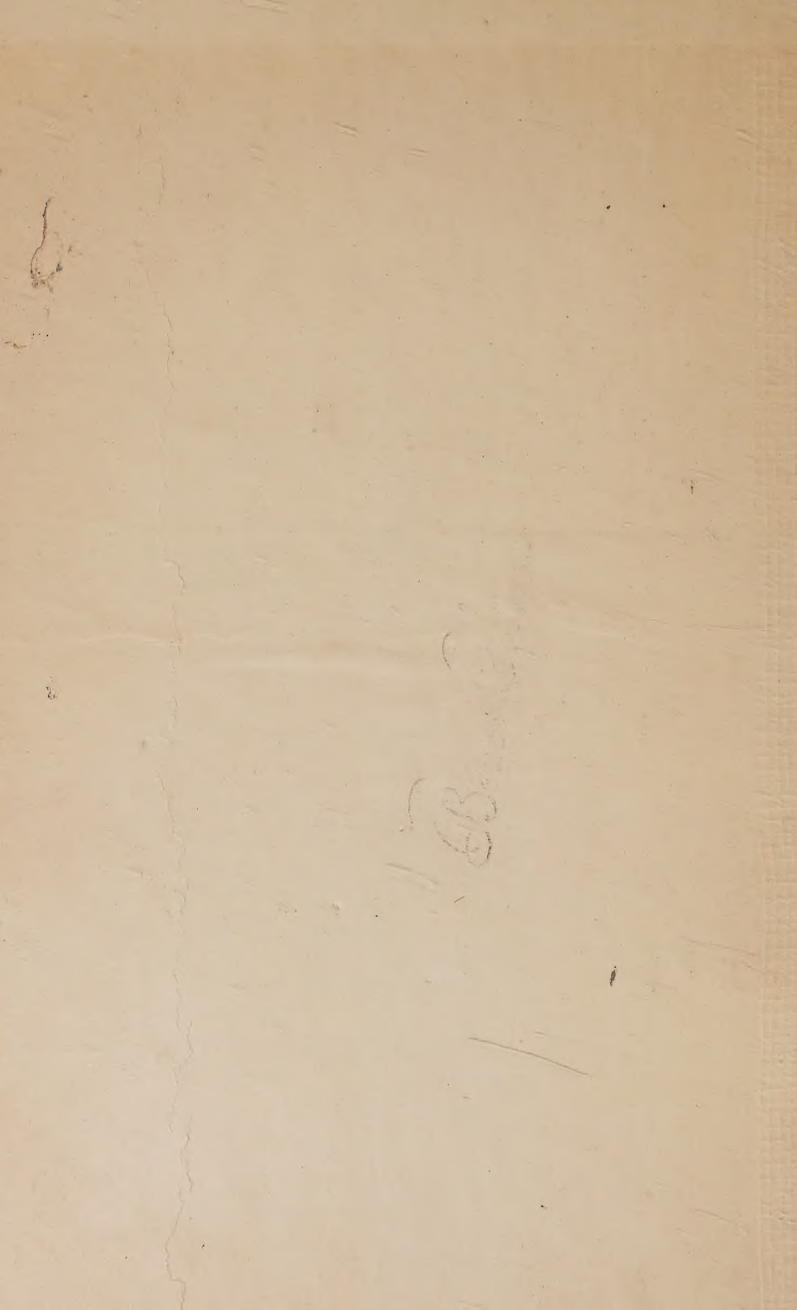


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FOR
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Compiled and Edited by
DANIEL BLOOMFIELD

Of Bloomfield and Bloomfield, Consultants in Industrial Relations, Author of
"Labor Maintenance," Editor, handbooks, "Employment Management,"
"Modern Industrial Movements," "Problems of Labor,"
Associate Editor "Industrial Relations,
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Introduction by
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School and Vocation." Editor, "Industrial Relations,
Bloomfield's Labor Digest."

Volume I

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PREFATORY NOTE

The interest in all forms of financial incentives for employees and executives is a growing one, and with such interest has come the widespread need for a handy reference book describing incentives in detail.

Better systems of reward for effort of employees are being devised constantly; the alert executive will therefore welcome the present work which brings together in convenient form the best of such systems, offering suggestions for adaptation to his own organization. The executive will find in this compilation a wealth of valuable material gathered from a large number of publications and reports, and by original investigations of the Bloomfield organization covering over one thousand concerns and plans.

Grateful acknowledgement is here given to the editors and publishers through whose courtesy much of the material herein is reproduced, to the companies and executives who have made their plans available, to Gorton James who assisted in preparation of Chapters 11 and 13, and to Arthur Price who helped get the material in shape.

DANIEL BLOOMFIELD.

January 12, 1923

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INTRODUCTION

This two-volume work fixes attention on the one big motive which underlies the efforts of about all who engage in labor or in management—the prospect of reward.

Much has been written of late years about natural instincts, motives and ideals in industry. That is to say, discussion has centered on human nature in employment relations. The discussion has been of value, for it is useful and necessary to realize that whole human beings, not fractions of them, are doing the work of the world.

The beginning of economic wisdom however, is an appreciation of what men want when they exert themselves.

A large amount of talk about this all-important topic has lost itself in a mist of generalization and in a forgetfulness of the motive force that keeps economic thinking on solid ground. That force is, by-and-large, a concrete financial return for effort expended. The prospect of such reward is the incentive for effort. It may not be the highest of incentives; and, surely, it is not the lowest; but positively it is the most potent.

There are, to be sure, intangible incentives and compensations; some of them of great influence. This work does not go into these. It confines itself to the practical economics of average effort in a work-a-day world. Yet this simple, fundamental presentation carries very large meanings. A large part of management's duties and a still larger part of the average worker's thinking are devoted to the problem of squaring remuneration with results, effort with return; that is to say, adjusting the proceeds of enterprise to the just expectations of those who engage in it.

There is not a more practical question than this. Indeed all others are beside the mark, unreal and remote, until the financial has been disposed of.

So the present work goes to the very core of employment practice and business relations. It discloses a variety of attempts to solve the key problem of adjusting work and pay on as approximately a satisfactory a basis as is possible.

No final formula will be found, because human expectation has not yet ceased to be a growing thing. But a large number of well-conceived, and some highly successful examples of adjustment, of incentive-stirring experiences, are carefully recorded.

The subject thus opened up in terms of actual experiences, of the things done to cooperate with that steadiest of all motives, the economic—gives rise to many reflections that bear on economic well-being.

The purpose of effort, the skill in directing it, the concrete encouragement afforded to human nature in employment and management go on record here as fully as expert knowledge and research could secure.

No more useful guide for the manager—no more serviceable handbook for the average contributor to the wants of man (and this book includes most of us) will be found than the present compilation of financial incentives.

MEYER BLOOMFIELD.

PART I

CHAPTER I

GENERAL CONSIDERATIONS

PROBLEM OF INCENTIVES UPPERMOST TODAY¹

Old-fashioned tactics of trade unionism of the orthodox type have passed the high-water mark. The fascinating process of screwing up wages and clipping off hours has about gone to the limit under present conditions. The policy of demanding higher and still higher wages with little or no regard for the source whence the wages fund flows will no longer stand the test. If labor is to get greater returns, labor and management must accomplish more. The problem of incentives is now more vital than ever before in the history of industrial enterprise. Both the owner of the capital invested in the business and the worker who invests himself have lost the immediate and direct interest in the business which was such a notable and significant characteristic of small-scale industry.

How can the clock-watching, inert, listless, output-restricting, discontented worker be transformed into an interested, alert, pushing and efficient achiever?

And, how can the managerial staff of the corporation be given the professional spirit which will lead them to be interested in quality and quantity production rather than in more profits?

These are two of the most searching problems in modern industry today. Both problems grow out of or are at least greatly accentuated by the unprecedented growth of large-scale and corporate business.

¹ By Frank A. Carlton. Survey. 47 : 532. December 31, 1921.

BASIC PRINCIPLES OF INCENTIVE PLANS

The Committee on Labor Relations of the Cleveland Chamber of Commerce, after a study of incentive plans in Cleveland establishments¹ has formulated several basic principles which, in its opinion, should underlie incentive plans of the types under consideration and without which such plans are unlikely to prove effective. These principles are:

1. An incentive plan should have as its fundamental purpose the increasing of the value of employees' services both to themselves and their employer.
2. Such a plan should serve to promote confidence and understanding between the employer and employees.
3. To that end, the benefits to employees should be substantial and in addition to the current rate of wages.
4. The plan should not represent paternalism or philanthropy on the employer's part.
5. The participants in the plan should be informed as to the factors affecting the payment and amount of the incentive.
6. They should, preferably, be represented in the administration of the plan.
7. The plan should be designed to meet the needs of each enterprise and accomplish the worthy objects of the employer.
8. The success of any plan is particularly dependent upon the effectiveness of its management. Any plan, no matter how admirable may be its features, will fail unless it is properly managed.

THE PART THAT MANAGEMENT
PLAYS IN RESULTS ²

The general abolition of piece-work in railroad shops has confronted the managements of these shops with the problem of securing satisfactory output under a new set of conditions. In approaching this problem a clear understanding of the fundamental relations of supervision, labor incentive and labor output are highly desir-

¹ Cleveland Chamber of Commerce, 1921. "Employees' Incentive Plans in Cleveland Industries."

² Railway Mechanical Engineer. 93 : 297-9. June, 1919.

able if what constitutes a satisfactory output is to be correctly determined and the condition affecting its attainment properly controlled.

The real purpose of the piece-work system or of any of the other so-called reward systems of labor payment is to provide an incentive for the continued exercise of at least a satisfactory amount of skill and energy on the part of the workman. The prohibition now placed on all such systems of wage payment in railroad shops leaves to the workman only a portion of this incentive. It is evident, therefore, if satisfactory results are to be effected where piece-work has been abolished, that their attainment becomes more largely a matter of administration, which involves the quality and quantity of supervision and assisting adjuncts provided by the management. Basically, the problem does not involve the question of shop practice, or shop facilities, but is confined to the relative administration of the various systems of payment under the same physical conditions.

INCENTIVE VS. QUALITY AND QUANTITY OF SUPERVISION

To some it is difficult to appreciate how satisfactory output may be assured. To the incentive referred to—i.e., the ability to voluntarily increase the earning rate by increasing output—most workmen respond at least to the point of maintaining with a minimum amount of supervision their output, even under adverse conditions of shop service and facilities, if not always to the extent of actually increasing their output beyond that represented in a performance which workmen are morally bound to give and the employer has a right to expect under a day-work system. The loss of this incentive may be made up in quality and quantity of supervision and in the conditions and facilities which may

be embraced under the general caption of supervision aids—those things outside of the supervising personnel making for the goal of highest efficiency represented by maximum output and minimum cost.

The efficiency obtainable varies with the adequacy of either or both the quality and quantity of supervision and the supervision aids, so that in order to maintain a selected or given efficiency, any loss in one of these items must be made up by an adequate increase in the other.

EFFECT OF VARIATIONS IN WAGE SYSTEMS SMALL

Between the two extremes represented by the day and piece-work plans there are many systems,—premium, bonus, profit-sharing, etc.—which may be generally classed as divisional, because they are compromises under which the labor savings and losses resulting from increased or decreased output are divided between the employer and employee. The equity of compensation to the employee and of cost to the employer, in the case of all of them, is dependent on proper determination of the “time corresponding to satisfactory performance,” since it will readily be realized that when such time is properly determined, along with the employee’s hourly-rate, the workman is not concerned in the plan under which he may be paid his compensation, so long as it is equitable and in correspondence with the skill and effort which he exercises. The employee complains justly when, under any system of payment, after having adequately fulfilled his obligation to exercise during a specified time the proper amounts of skill and effort, he fails to obtain his “commensurate rate.”

Under uniform degrees of management efficiency the actual differences due to variation in wage systems are relatively small: any large variation in the efficiencies

of operation under them must be due to variations in the efficiency of the methods and the management under which they are administered.

So far as the workman is concerned, the most vital factor in administration is the equitable determination of the time corresponding to satisfactory performance. Whether this time be used in the determination of a piece-work price, a bonus or premium system schedule, or the judgment of the supervising officer upon the matter of whether the workman has succeeded or failed to deliver satisfactory performance under day-work, the determination of this time is all important. If it is low under the piece-work system, the resulting piece-work price will inadequately compensate the workman. So also in the case of the bonus or premium plan, while under the day-work system, the workman may be unfairly criticized by the supervisor. If too liberal, an unfairly large piece-work price will result, which, according to experience under the piece-work system, is subsequently adjusted, i.e., lowered. These adjustments have caused discontent. The same is also true with regard to the bonus of premium schedules, while under the day-work system of operation, it results in a loosely operated, low efficiency shop.

The time consumed in the satisfactory performance of any operation under given conditions can only be determined from some sort of a time study. This is a very elastic term covering a wide range of precision and exactitude from that involved in, say, the gathering of information upon which to base a rough estimate of the time required for a day-workman to mow a lawn, to that referred to by some as of the "blood-drawing type," involving the most minute stop watch data which has, in some places, been applied to the determination of working schedules. Workmen rightfully object to the latter, especially until all conditions and adjuncts of shop operation have been reduced to a

degree of precision somewhat nearly consistent with the character of the time studies made.

PROBLEM WHOLLY ONE OF ADMINISTRATION

The fact that a reward system of payment is not used does not obviate the necessity of giving the time element any attention. Although not used directly in the determination of wages, the keeping of accurate output records must be of very significant value in connection with the day-work system; in fact, such records are essential to the maintenance of high shop labor efficiency. Such records form an essential part of the "supervision aids" previously referred to, which result in either (1) increasing the capacity of a given "quality and quantity of supervision," with respect to the number of workmen covered, or of (2) making it possible for the same "quality and quantity of supervision" to enhance the shop's efficiency.

The problem, therefore, is wholly one of administration, involving the provision of adequate supervision and of aids thereto, including shop records which may serve as a basis for measuring labor performance under the conditions and practices obtaining, for application to the individual workman, groups of workmen, whole departments, entire shops or to a number of shops collectively considered. To say that satisfactory outputs cannot be maintained under the day-work plan of labor payment apparently is to disregard the fundamental elements of the problem and their mutual relations.

It is, however, unreasonable with the day-work system, at a rate of, say, 68 cents per hour, to expect the exercise and delivery of the same amount of skill and effort within that hour, as under the piece-work or any other reward system of payment, in which the workman actually earns a higher rate of compensation, say the equivalent of 90 cents or 95 cents for that hour.

FITTING THE WAGE TO THE WORK¹

PLANS EIGHT EMPLOYERS HAVE USED SUCCESSFULLY

When all the men engaged on the same work are paid alike irrespective of what they turn out—the “slackers” getting as much as those who put in their full efforts—there is but little incentive to work harder than necessary to “get by” with the foremen. However, many manufacturers have found that making the wage the incentive to do more has worked to the advantage of the man on the job as well as to their own. The following examples offer a fair sample of the advantages which may result from giving more attention to the basis of pay.

The trouble of a manufacturer of tableware was in the plating department which absorbed about 10 per cent of the entire productive payroll. Here were prepared the surfaces of the articles through the use of caustic dips, salt water, and cyanide baths. The operatives lagged and the work moved most irregularly, although the wages were high. Experiments showed that no saving could be had by installing new equipment.

The stop watch indicated that a workman should normally finish a piece in forty-two seconds. Therefore the problem simmered down to discovering some kind of a wage incentive to make the men work at capacity. A standard output per man was measured by the watch and called 100 per cent. Then a bonus curve was started, taking 65 per cent of efficiency as zero and paying a rising bonus which reached 25 per cent at 100 per cent efficiency. Above the standard the bonus was 1 per cent for each 1 per cent of efficiency. Within a few weeks the men were making bonuses that ran anywhere

¹ By W. R. Basset of Miller, Franklin, Basset and Company. *Factory*, 21 : 236-8. August, 1918.

from 25 per cent to 40 per cent of their former week's pay and the flow of work left nothing to be desired. This is an illustration of how the wages which, on a flat basis, were high per article, may be made highly profitable when paid out for productive energy.

Sometimes most unexpected factors crop up in the fixing of wages—factors that are entirely human and are not ferreted out except by close investigation.

HOW A DETAILED TIME STUDY DETECTED AN ACCIDENT HAZARD WHICH SLOWED UP THE OPERATION

In a punching operation each piece of stock handled weighed thirteen and one-half pounds. The operator sat before the punch and lifted the steel plates from a table on his left. The horizontal distance from the pile to the punch was about fifteen inches and the work was very hard on the puncher's wrist. A time study of the various operations showed that each operator should turn out two hundred and fifty pieces an hour, which meant the handling of a fraction over thirty-five tons of metal by each man in a ten-hour day.

"Overall" time studies of several of the most experienced men, who were kept from lagging by a guarantee of existing rates with extra pay if they came up to the standard, gave the best average performance as thirty-three and one-half tons or about one and one-half tons under standard. At first it seemed as though the fatigue of lifting so much metal during the course of the day had been underestimated—but the stop watch quickly dispelled that idea. The production was steady throughout the day, whereas if fatigue had been an element the hours at the beginning of the day would have shown a greater output than those at the end. Finally it developed that the real trouble was fear of catching fingers. If the operator happened to take up a piece less quickly than usual—after the punch head

had started down—he would miss the stroke rather than endanger his hand.

Another careful study was made to determine whether it might pay to run the press more slowly, but that reduced the output more than the missing did. So here the rates were not fixed at the standard indicated by the time; it would have been unfair not to take into account the human factor of danger. Yet I have seen rates where, to make the standard, the workman had constantly to risk himself.

Another interesting wage problem came up in a book-printing plant among the operators of monotype type-casting machines. These men had been working at what was considered an efficient rate of speed. The monotype consists of two independent machines, the keyboard and the type caster. The keyboard is not unlike that of a typewriter; striking the keys perforates a paper ribbon. This ribbon is placed in the casting machine, which operates on the same principle as the player piano. The problem was to discover how much time should be taken to cast a given ribbon. First it became necessary to find a standard of measurement. Each notch on the ribbon casts one piece of type regardless of size. The number of notches on the ribbon was the obvious standard of measurement; a counter on the keyboard determined the quantity in each ribbon. It was easy to find time taken to cast a ribbon and to reduce that to a per notch time.

Other time studies gave the necessary allowances for setting up the machines and renewing the molds when type sizes were being changed. Having found all these times, a reasonable standard was fixed and a bonus of 30 per cent announced for performers finishing within the standard time. Within a month the operators were earning the bonus. They increased the production by 40 per cent and the repair time dropped from 15 per cent to 5 per cent. In that particular plant, night work

is often required during the rush seasons, and the production at night was previously much lower than during the day; with the incentive of an opportunity to make more pay the night men equaled the day operators.

One can apply motion study to almost any operation and achieve results, but the most striking ones occur in the study of gang movements. Putting team work into a gang of ten or twelve men sometimes brings almost incredible savings. Everyone knows that a football team of "stars" who have not been playing together will be beaten by a team of individually poorer players with perfect team work. It is the same with gangs of workmen.

DEVELOPING TEAM WORK AND PAYING ON A BASIS OF WORK DONE REDUCED A GANG FROM TWENTY-ONE TO SEVENTEEN MEN

I discovered some years ago that a concrete mixer was expected to be attended by twenty-one men. Each gang that I observed had a method all of its own but always twenty-one men were involved. That was the orthodox number, but I decided to be a heretic. I took the good points from a number of gangs and made a new work plan which reduced the gang to seventeen and not only increased the output of the mixer but better distributed the work. Previously when the mixer was operating and therefore not receiving either sand or gravel, the men stood around and looked at it. Under the new system during this interval, they filled and made ready a number of spare barrows. More gravel was required than sand and the sand barrows piled higher; therefore we had a sand man take a barrow of gravel at every third or or fourth trip instead of a siesta. The contractor found he could increase the wages to a point that made desertions rare. He could even have doubled the pay.

Here is another gang case. A steam shovel was

excavating for a road foundation. The operating crew consisted of an engineer, a fireman, two laborers and three teams. One hundred and thirty-five linear feet of cut was held to be a big day's work, but at that rate the contractor discovered that he was paying more for excavating than he received. The stop watch put on the various movements of both shovel and men, turned up waste and lost motion at nearly every point. The shovel was not being pushed to its capacity and the men got in one another's way. It was easy to rearrange the gang so that they did not interfere with each other and then a bonus was set for all excavating done in a day above a certain amount. Within a few days the amount excavated had nearly doubled, while the cost dropped from 30 to 22 cents a cubic yard.

The manager of a branch plant in the middle west complained that he could not afford to pay his unskilled laborers more than \$2.25 a day and therefore he could not keep them because the railroad construction gangs were offering \$2.50 a day. The work was to break bales out of cars and truck them into two adjoining warehouses. The bales were about the same size as a bale of hay but quite a little lighter. The layout of the plant and the manner in which the bales had to be stored put mechanical conveyors out of the question. They had a good foreman on that job, but he could not see all of the men all of the time. The stop watch disclosed that, except when under his eye, the truckers did not do better than a speed of one mile and three-quarters an hour; any trucker should make at least three miles an hour.

This would not seem ordinarily to be a case for piece-rates and yet piece-rates turned the trick. Rates were set covering every possible combination of points of receiving, length of haul, and height of piling, and the men were divided into gangs of breakers, truckers, and pilers. Being paid for the amount that they did instead of for the time that they hung around the plant,

speeded all of them up until not a single man was earning less than \$3 a day and instead of thirty-three men, nineteen were found to be amply sufficient. The company saved more than one-third of its direct receiving labor cost.

The chief difficulty to be encountered in the fixing of a wage incentive for a gang is that, as a rule, gangs are poorly balanced. Usually they must be reformed before anything approaching satisfactory wages can be fixed. Nearly every group of employees which has not been scientifically assembled contains in it a "neck of the bottle" and, because employees like to "soldier," it is extremely hard to discover the neck without time study. A casual observer or foreman will seldom indeed be able to detect it.

ONE COMPANY SAVED \$5,000 A YEAR BY ADJUSTING INEQUALITIES OF ASSIGNED TASKS IN GANG WORK

In a factory making kitchen utensils of various kinds and values was a department in which the wares were inspected, wiped off, and wrapped. In this department were a number of tables with three operators assigned to a table—one to inspect, another to wipe and a third to wrap. They were paid by the piece on the output of the table, the inspector receiving 40 per cent and each of the others 30 per cent of the total table wage. A time study revealed the true proportions of their labor. On one type of ware for instance, the inspector's time was 100 per cent more than that of the wiper and 60 per cent more than the wrapper's. On another type, the wiper had an increased amount of work. In fact scarcely ever could the three do an approximately even amount of work—a requisite for an even flow of production.

Here the solution proved to be a new arrangement of the department. A number of extra tables were put in and, instead of moving the ware from table to table,

the girls themselves moved. Girl A, the inspector, would examine the ware on table No. 1, then move to table No. 2, and so on. Girl B, the wiper, and girl C, the wrapper, followed after her so that at no time was more than one girl at a table and each girl was paid only for the work which she did as an individual. The number of inspectors, wipers, and wrappers was regulated according to the time studies for the type of ware. If the inspection took twice as long as the wiping and wrapping, two inspectors were put on followed by one wiper and one wrapper; thus it became possible to keep each individual in the department busy. The new arrangement turned out so much more work that it was possible to reduce the day from ten to eight hours and the force from thirty-nine to thirty-two operatives.

In addition the individual wage increased although the labor time decreased. This relating of one job to another saved that company a net of nearly \$5,000 a year.

SOME OF THE PRINCIPLES TO BE CONSIDERED WHEN MAKING WAGE ADJUSTMENTS

Wage incentives ordinarily are designed to increase production. Some employers, however, are afraid to **put them into effect** when the material used is more valuable than the labor. Thus in leather cuttings, a careless man can easily waste several times his daily wage. **But it is not difficult to take care of the quality** as well as the speed in the fixing of wages. A common and not altogether satisfactory method is to refuse to pay the rate on spoiled pieces, enforcing a penalty for carelessness. The danger here is that the workman may dwell too much on care and sacrifice production which means a high rate and consequently a high labor cost. On the other hand if the value of good and bad work is not correctly measured the clever workman may discover his advantage lies in turning out as many

seconds as firsts, and this again is a very expensive practice for the owner.

In many places it has been found profitable to separate the quantity and the quality ratings; that is, to pay a certain piece-rate—or whatever wage method may be employed—and then add a bonus for exceptionally high standard work, in some cases also making a deduction for exceptionally bad work. In one shop this has worked out very well indeed.

The men there operated small speed lathes on a piece-rate basis. Their quality rating was a separate matter and was determined each month by a committee consisting of the factory superintendent, the department foreman, the department inspector, and the machine foreman. The committee had before it the inspector's report on each man's work and rated him accordingly. "Perfect" was 1,000 points.

Above 900 was "excellent" and so down the scale to below 100 which was "very poor." The higher classes received bonus payments and, in addition, their members were posted monthly on the bulletin board as an additional incentive. The greatest number of men were usually in the classes calling for 700-600 or 600-500 points; but few fell into the class below 300.

The extraordinary flexibility of wage incentives makes it possible to use them to advantage in many employments where they do not, at first, seem feasible. And, if well chosen, they will commonly make labor happier and better paid while, at the same time, they usually reduce the employer's production costs.

CHAPTER II

TYPES OF WAGE SYSTEMS

TYPICAL METHODS OF WAGE PAYMENT¹

The following is a digest of the seven principal methods of wage payment.

1. THE CONTRACT SYSTEM

This method of employing and paying labor is used to some extent in shipyards and locomotive works. It is what might be called a gang piece-rate system. The employer contracts with a gang boss to do a certain part of the work—such as assembling of the valve gear of a locomotive, etc. The employer furnishes the material, tools, etc., while the contractor provides the men.

All the discipline and responsibility falls entirely on the contractor.

The method of payment under this system may be either day-work or piece.

ADVANTAGES CLAIMED

1. It takes the burden and responsibilities of labor disputes and the like from the shoulders of the employer (leaving it all to the contractor).

DISADVANTAGES CLAIMED

1. It leads to a demoralizing divorce of authority and liability. The workmen and the contractor have little interest in the upkeep of the tools and equipment and the wear and tear is very often too heavy.
2. Leads to driving of workers.
3. It is a survival of the sweatshop contractor system.

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2. THE TIME-RATE METHOD

The oldest and most common method of wage payment is the time-rate, usually called day-rate. The unit of time may vary from one hour to a week or a full year. Under this system the method of payment is determined entirely by the amount of time spent on the work. The worker is paid for his time by the hour, day or week, etc. In most such cases labor is paid at an hour-rate, with extra compensation for overtime.

The usual method is to divide the workers into groups or classes and fix a minimum and maximum rate for these classes.

ADVANTAGES CLAIMED

1. Day-rate, while giving the workman perhaps the smaller reward as compared to other plans, in turn protects him against loss should he fail to do even a fair day's work.
2. It tends toward better quality of workmanship.

DISADVANTAGES CLAIMED

1. It deprives the workman of any additional compensation in proportion to increased effort, skill or diligence.
2. The incentive to conscientious endeavor is not stimulated, thus preventing maximum production.
3. Difficult to measure what a worker does.
4. Means payment for idleness at times while worker completes one job and waits for the next job.

3. THE PIECE-RATE SYSTEM

Straight piece-rate is the first of the production payment methods that supplanted time- or day-rate compensation. Under this method of rewarding labor the workman is paid for the amount of work performed and not the time expended. The worker is paid so much for each operation, or piece of product turned out. The compensation of the worker is proportional to his exertions. Any increase in his production would mean an

increase in his pay envelope while any falling off in his production would mean lowered daily earnings.

ADVANTAGES CLAIMED

1. It gives the ambitious workman the incentive and opportunity to secure increased compensation due him on account of his greater skill or diligence.
2. It stimulates greater production which lessens the cost of overhead expense.
3. It saves constant supervision and driving the workers.
4. It weeds out the inefficient and mediocre worker.
5. It eliminates discrimination and favoritism.

[A large engineering concern which has checked up this chart makes the statement that this is not true in practise according to their experience and that in most of the shops the piece-rates are mere guesswork and consequently some very unjust rates exist. "We have found that in shops working under piece-rate systems the employer is supposed to give out the work so that each employee will receive some work which has high piece-rates and some which has low piece-rates. We find, however, that there are many cases of favoritism and discrimination by foremen in giving out the work."]

DISADVANTAGES CLAIMED

1. It does not assure a minimum day-wage.
2. It has the danger of rate cutting with resulting friction.
3. It encourages excessive speeding—detrimental to the worker's health.
4. It has the tendency (on the part of the worker) to sacrifice quality for quantity.
5. It is difficult to set a satisfactory piece-rate, one that does not require adjustments from time to time.

[It is suggested by an engineer who has checked this chart that this is true as a general statement, but not true in many shops operating under piece-rate systems.]

The reason of this is that many piece-rates are set from detailed time studies, which are taken in accordance with Frederick W. Taylor's principles from which the Differential Piece-Rate Plan was evolved.]

6. It has danger that as the workman becomes more skilled his task will be increased.

7. Operatives on piece-work often lay off work for a day or more and then work at high speed for the rest of the week.

8. It means restriction of output to prevent rate-cutting.

4. THE HALSEY PREMIUM PLAN

Under this method of rewarding labor the worker is paid a day-rate with a premium for any improvement in output over the standard time. The standard time under this plan is determined by previous records of actual performance in the shop, and not a standard set up by scientific time study and a standard detailed practice.

For every hour the workman can shorten this time he is paid a fraction of his hourly wage as a premium. This premium may be one-third, or one-half of the time saved. Thus suppose the time set for a job is three hours and if the job takes actually only two hours, the worker may be paid in addition to his regular hourly rate, one-half of the time saved or one-half an hour at his regular rate. Under the one-third premium plan he would receive extra compensation for one-third of the time saved.

ADVANTAGES CLAIMED

1. A day-wage is assured.
2. The plan is very simple and not confusing to the workman and is thus easy to introduce.
3. Workers are rewarded in proportion to their effort.

4. The reward is immediate and substantial. (Duncan.)¹

5. The employer, in sharing the gains of the extra exertion on the part of the worker, does not have the necessity of cutting the rate in an arbitrary manner, hence the workman's mind is relieved of the fear of having the wages reduced arbitrarily. (Duncan.)¹

6. It is a "50-50" proposition and appeals to a sense of fairness.

DISADVANTAGES CLAIMED

1. The rates are set by judgment or based on records that do not represent the workman's full capacity.

2. It relies almost entirely upon the workman's knowledge of his job (detailed performance of operations not standardized).

3. "It does not give the workman a definite goal to reach, hence the high wage paid does not reduce the output cost." (Frederick W. Taylor.)

(The above is true only in the absence of time and motion studies.)

THE HALSEY PLAN

Wage: 50c. per hour. Premium: One-half time saved

Hours		Compensation				Labor cost			
Standard	Actual	Hours saved	Time wage	Premium	Total wage	Earnings per hour	No. of units made	Labor cost	Unit cost
4	4	0	\$2.00	.00	\$2.00	\$.50	4	\$2.00	\$.50
4	3	1	1.50	.25	1.75	.58½	4	1.75	.43¾
4	2	2	1.00	.50	1.50	.75	4	1.50	.37½
4	1	3	.50	.75	1.25	1.25	4	1.25	.31½

Premium: One-third of time wage saved

4	4	0	\$2.00	.00	\$2.00	\$.50	4	\$2.00	\$.50
4	3	1	1.50	.16 2/3	1.67	.56	4	1.67	.41¾
4	2	2	1.00	.33 1/3	1.33	.67	4	1.33	.33¾
4	1	3	.50	.50	1.00	1.00	4	1.00	.25

¹ Duncan. Elements of Industrial Management.

5. THE TASK AND BONUS PLAN

This plan was devised by Henry Gantt and was based on having the operations studied with a stop watch, as instituted by Dr. Taylor. In fact, Mr. Gantt worked out his plan under Taylor.

Under this system a definite performance (the task) for a given time is set. If the worker can accomplish this task in standard time or less he receives a bonus in the form of an extra time allowance varying from 20 to 40 per cent of the time allowed for the task (according to the nature of the work and the degree of inducement necessary to insure the interest of the worker). If the workman fails to meet the task he receives only his basic day-rate which is guaranteed to him. This plan of wage payment works exactly like a day-rate up to the time the workman turns out the standard output and from that time on exactly like a straight piece-rate.

This plan also provides a bonus for the foreman when a given proportion of men under him earn their bonus. This encourages the foreman, not only to teach the men all he can, but to remove all obstacles before them.

ADVANTAGES CLAIMED

1. It insures the workman his day-rate and hence makes it easy of introduction.

2. It makes a high rate of production possible (as under the Taylor system) and offers a great inducement for high performance.

3. It reduces labor cost per unit of product.

4. It eliminates all possible undue overspeeding (as is the case in straight or differential piece-rate pay systems).

5. It provides all possible assistance to the worker that may help him earn the bonus. (Training in the skill necessary to earn the bonus and also in habits of industry).

DISADVANTAGES CLAIMED

1. Like the Taylor plan, the transition from inefficient time pay to standard time and bonus is made too abruptly; dividing the workers thus into two classes—those that can earn a bonus and those that cannot.

2. All but the most ambitious are apt to fall back frequently upon the guaranty.

William O. Lichtner of the Thompson & Lichtner Co. finds that there is a great prejudice against the task and bonus. "The fundamental idea of the task work is good for it gives a time measure, which instructs the workman as to the speed required to accomplish comfortably a good day's work. The term 'task' is badly chosen, however, because workmen chafe under the idea of a task and we find that 'time work with a bonus is the best.' "

The following is an excerpt from Mr. Lichtner's book on Time Study and Job Analysis, Chapter XVI, published by The Ronald Press Co., New York:

TIME WORK WITH A BONUS

Time Allowance

a. Set a standard time for all major operations of the department.

b. Allow additional time to compensate if any abnormal or unforeseen conditions arise on a job on which a standard time has been set.

c. Give each new operator who is put under instructions upon going on a job of bonus work an additional time allowance. The amount of additional time and the period over which this time applies will vary with the skill required to do the work, the length of time operator has been on the operation, and the number of changes in the method of operating adopted as standard.

d. Do not pay a bonus on the extra allowed time, but only on the standard time in which the work should be completed.

Money Payments

a. Set a base rate or rate per hour for each operation of the department. Each operator will receive the rate of the operation on which he is regularly employed.

b. The bonus will be a percentage addition to the "Standard Time" provided the time taken to do the job is equal or less than the time allowed. Otherwise, the operator will be paid at the base rate for time taken.

c. When starting on bonus work, an operator who does not earn more than his present rate will be guaranteed this rate for a period of not more than three months. This will be called his guaranteed rate.

d. When a bonus worker is required to work for less than a day on work of his own class which cannot be put on a bonus, he will be paid the base rate for the time actually put in on this work.

e. When a bonus worker is required to work for a day or longer on work of his own class which cannot be put on a bonus, and if he has been earning his bonus 75 per cent of his total working hours for the past period, he will be paid on the same basis as the average of his past month's earnings.

f. When a bonus worker is transferred to a different class of work, he will be paid the base rate and bonus on his regular work, provided the work is done within the standard time, unless he can make more money on bonus at the new job.

g. In case a bonus worker makes a mistake in his work and does not rectify it at the time he does the work, he will not receive his bonus. No worker will be given additional time to correct his mistake. If any work is discovered to be faulty by another department, the amount of bonus paid for the job on which the work is faulty will be deducted from bonus earned and not yet paid.

h. The overseers or foremen will be on a day work basis with no bonus payments as they represent the company and are responsible for the quality and quantity of the product.

i. A bonus worker earning a bonus as designated in paragraph b will be paid for the time allowed plus the bonus on the time allowed.

THE GANTT TASK AND BONUS PLAN

Wage: 50c. per hour. Bonus: Minimum and maximum

Hours			Compensation						Labor cost					
Standard	Actual	Time saved or lost	Time wage	Bonus		Total wage		Earnings P. H.		No. of units made	Labor cost		Unit cost	
				20%	50%	20%	50%	20%	50%		20%	50%	20%	50%
4	6	-2	\$3.00	\$.00	\$.00	\$3.00	\$3.00	\$.50	\$.50	4	\$3.00	\$3.00	\$.75	\$.75
4	5	-1	2.50	.00	.00	2.50	2.50	.50	.50	4	2.50	2.50	.62½	.62½
4	4	0	2.00	.40	1.00	2.40	3.00	.60	.75	4	2.40	3.00	.60	.75
4	3	+1	1.50	.90	1.50	2.40	3.00	.80	1.00	4	2.40	3.00	.60	.75
4	2	+2	1.00	1.40	2.00	2.40	3.00	1.20	1.50	4	2.40	3.00	.60	.75
4	1	+3	.50	1.90	2.50	2.40	3.00	2.40	3.00	4	2.40	3.00	.60	.75

6. DIFFERENTIAL PIECE-RATE (TAYLOR) PLAN

This method of payment known as the Taylor Differential piece-rate is based on careful time studies as a preliminary to fixing any rate of compensation. The task or number of units which a workman can produce in a given time is determined and taken as a standard. Two piece-rates are then set for the work, a high rate if the worker does his task in the standard time, or less, and a lower rate, if he fails to do his task in the standard time set.

Under this plan the workman receives not only a high piece-rate if he reaches and exceeds the standard, but receives the full piece-rate per piece as his production rises, after he has attained the standard performance.

ADVANTAGES CLAIMED

1. It pays a wage more commensurate with the effort of the worker.

2. It reduces to a minimum the chance of fixing the rates out of all proportion with existing standard of wages.

3. It eliminates the necessity of cutting rates, a practice so disastrous to employee and employer alike.

4. It stimulates the worker toward maximum production.

5. It penalizes the workman if he fails to put forth his best efforts, since the low piece-rate is set purposely low to spur the man to try to attain the higher rate.

DISADVANTAGES CLAIMED

1. A day-wage is not assured to the worker.

2. There is the danger of undue overspeeding (as in the case of straight piece-rate method of payment).

3. It does not leave enough room for initiative on the part of the workman to originate betterment in practice (since the time set is already predetermined and standardized by the time-study man).

THE TAYLOR DIFFERENTIAL PIECE-RATE SYSTEM

Low rate: 40c. High rate: 50c.

Hours			Compensation			Labor Cost		
Standard	Actual	Time saved or lost	Time Wage	Wage per day	Rate per hour	No. of units made	Labor cost	Unit cost
4	6	-2	\$1.60	\$1.06 $\frac{2}{3}$	\$.26 $\frac{2}{3}$	4	\$1.60	\$.60
4	5	-1	1.60	1.28	.32	4	1.60	.52 $\frac{1}{2}$
4	4	0	2.00	2.00	.50	4	2.00	.50
4	3	+1	2.00	2.64	.66 $\frac{2}{3}$	4	2.00	.37 $\frac{1}{2}$

7. THE EMERSON EFFICIENCY PLAN

Under this method of compensation a day-rate is paid with a gradually increasing bonus after an output of 66 per cent of the standard has been attained (i.e., the workman is supposed to be about $\frac{2}{3}$ as efficient as the average man could be). No bonus is paid the worker unless his efficiency reaches 66 $\frac{2}{3}$ per cent. At this point he receives a very small bonus, but the bonus increases as his performance rises till at 100 per cent efficiency he receives 20 per cent of his day-rate as a bonus i.e. at 70 per cent 2 per cent; at 80 per cent, 3 $\frac{3}{10}$; at 90 per cent, 10 per cent; (e.g. at 100 per cent efficiency he receives 20 per cent of his day-rate as a bonus).

The unit of efficiency is determined for a period of time, such as a day, week or month and not for individual operations or jobs.

ADVANTAGES CLAIMED

1. It assures the workman his day-wage.
2. It establishes a standard performance that represents a full and fair task for the worker.
3. It offers a large bonus for the attainment of the

standard (as in the Gantt task bonus plan), but smaller bonuses may be earned before reaching the standard.

4. It provides for increasing efficiency not only on separate jobs, but per day, week, or month (while the other plans have the individual jobs as a basis) preventing possible overspeeding on individual jobs with resulting exhaustion and lowered efficiency on subsequent jobs.

5. It provides for a constantly reduced labor cost per unit of product as the efficiency of the worker and his earnings per hour increase (even after the worker has exceeded 100 per cent efficiency).

DISADVANTAGES CLAIMED

1. There is the same objection to this plan as to other plans which set a task arbitrarily and without consulting the worker.

2. While the plan assures the worker a day-wage, it does not assure him a wage as high as in plants where there is no "efficiency" plan.

3. The plan sets a goal which few can reach without overstrain.

4. The standard of accomplishment is set so high that it is almost impossible for an operative to be more than 100 per cent efficient.

THE EMERSON EFFICIENCY BONUS PLAN

Hours			Compensation				Labor Cost			
Standard	Actual	Percentage efficiency	Bonus			Total wage	Earnings per hour	Labor cost	No. of units made	Unit cost
			Time wage	% wage	Time amount					
4	6	66 $\frac{2}{3}$ %	\$3.00	0%	\$0.00	\$3.00	\$.50	\$3.00	4	\$.75
4	5	80 %	2.50	3.3%	0.08	2.58	.52	2.58	4	.65
4	4	100 %	2.00	20%	0.40	2.40	.60	2.40	4	.60
4	3	133 %	1.50	53%	0.80	2.30	.77	2.30	4	.58
4	2	200 %	1.00	120%	1.20	2.20	1.10	2.20	4	.55
4	1	400 %	.50	320%	1.60	2.10	2.10	2.10	4	.52

DISCUSSION OF PAYMENT SYSTEMS ¹

Various modifications of these payment methods have been suggested. Mr. Hugo Diemer describes in his book, *Industrial Organization and Management*, a combined bonus and premium plan in which 20 per cent of the hourly wages was paid as increase if work was done in standard time, and a further "gain-sharing bonus," on the Halsey premium plan, was paid if work was done in less than standard time.

The task and bonus plan may be applied as a rate per hour, with the addition of any desired extra compensation for time, attendance, length of service, quality of product. To this may be added a flat rate per hour extra for all product turned out in standard time, instead of paying the bonus as a percentage of the time allowed.

There are many advantages in any plan which allows a considerable part of the wages to be paid on an hourly basis, with further increases to those who approach or exceed standard output. The efficiency reward should be at least 20 per cent of the total wages or it will not be large enough to act as an incentive. One recommended plan is a time- and piece-rate for all product over a given minimum, the piece-rate beginning with a production of from 50 to $66\frac{2}{3}$ per cent of standard.

The time-rate may depend upon efficiency, versatility, length of service, attendance, quality of work, etc., and gradually increase with the operator's progress in these several fields. This time-rate should be paid in any case whether operator's output is high or low, although if the operator constantly produces the greatest output, he will receive a higher time-rate for this ability.

The piece-rate for production over a given quantity should begin at a standard that is not so high as to

¹ From *The Wage Setting Process*. Bulletin. Federal Board for Vocational Education, 1920.

discourage the less efficient. It is desirable that all eventually receive a considerable part of the total wages as a result of output.

Such a plan gives a reasonable latitude in periods of rapidly fluctuating wages, such as we have just been experiencing during the war. The piece-rate and the standard output will remain unchanged. The modification in wages to meet advancing going rates will be made in the time-rate.

After an operator has received a given time-rate it is always to be hoped that this rate will never be lowered even if the general scale of wages declines. With such a plan as the above it may be possible to maintain a scale as established, but arrange that as new employees are hired, during a cheaper labor market, they will receive hour-rates conforming more nearly with going rates of wages. No injustice is done those employees who may receive lower hour-rates, as their length of service, efficiency, and knowledge of various operations must be less than that of the older employees who have reached the higher rates.

Any piece-rate, either straight piece-rate or differential piece-rate, once established must never be reduced unless the task is simplified so that by mutual agreement between operators and management a lessened piece-rate is accepted.

If this policy is agreed upon it is apparent that when a high rate on a straight piece-rate basis is put into force, under stress of a high labor market, it becomes a permanent part of costs.

If such is the case there is no possibility of reducing costs as far as labor itself is concerned except by higher efficiency, improved methods of production, etc., but as changes of this nature come only gradually a considerable burden may be laid upon an organization because it has no chance to modify its labor costs in proportion to the labor market.

It is assumed that any progressive concern will desire

to pay as high a wage scale as possible and equal to or above going rates of wages for similar work in the same locality. But this need not mean, if general living costs are reduced and if with this reduction an easier labor market occurs, that the high wage made necessary by a period of stress should be continued for all new employees.

Mr. Hugo Diemer in his book shows by graphic charts the influence of increased output on the wage under the different wage systems.

If production time is reduced 50 per cent:

Day-rate does not vary.

Piece-rate shows 100 per cent increase in earnings.

Taylor differential piece-rate—

20 cents per piece, low.

30 cents per piece, high.

200 per cent increase in earnings.

Halsey 50 per cent premium—

50 per cent increase in earnings.

Rowan premium—

50 per cent increase in earnings.

Gantt task and bonus (30 per cent basis)

140 per cent increase in earnings.

Emerson efficiency—

120 per cent increase in earnings.

Time and piece for quantity production—

170 per cent increase in earnings.

A plan that has worked successfully in some places is to determine a reasonable day's output and arrange for all operators finishing the task to have the privilege of "calling it a day" and leaving, or staying and turning in as much extra work as they wish. This plan presupposes a carefully determined output and thoroughly planned methods of operation.

Most working men, if not women, are ready to work a reasonable number of hours a day. If the wage system will pay in accordance with the production of each individual, the able employees will produce as much as they are capable of doing, and will generally prefer to take their "time off" when they want it.

One other very important matter to bear in mind when adopting any of the systems of payment, other than the day-rate, is to have the pay system itself thoroughly understood by every operator. "The payroll department should be brought to the operator;" in other words, so arrange the method of computing earnings that each operator will be constantly informed of his output and earnings from the start to the finish of the payroll period.

This can be done by posting each job's earnings to an employee's ticket, which can be a duplicate of that furnished the payroll and cost departments. Any plan that fails to give continuous information to each operator of his progress on each job turned in, loses a large part of the incentive value of a production payment method; furthermore, such a method will be disliked by operators in general, although they may not mention it.¹

CHART OF WAGE SYSTEMS

The chart reproduced on page 34 gives comparisons of the various wage-payment methods.

The percentage of production has no influence on wages, which will always remain at 100 per cent, regardless of whether the operator produces 10 or 300 per cent.

Straight piece-rate or the low rate of a differential piece-rate plan coincides up to 100 per cent, when the differential piece-rate is increased, perhaps, 50 per cent and then is increased in proportion to increased production as indicated.

"Time- and piece"-rates above a certain minimum (in this case taken at 60 per cent, correspond with day-wages up to the time that output equals 60 per cent of standard, when they change to a piece-work plan for all increased production.

¹ Other wage payment plans in use include the Barth Premium Plan, Knoeppel Bonus Plan, Bedeaux Plan, Merrick Piece-Rate Plan, Ficker Plan, Baum Plan.

The Gantt 30 per cent bonus plan follows the line A-C-H, increasing 30 per cent over day-wages at 100 per cent production, and from then on increasing in the proportion indicated.

The Emerson efficiency plan begins to increase wages at $66\frac{2}{3}$ per cent and pays 20 per cent more than

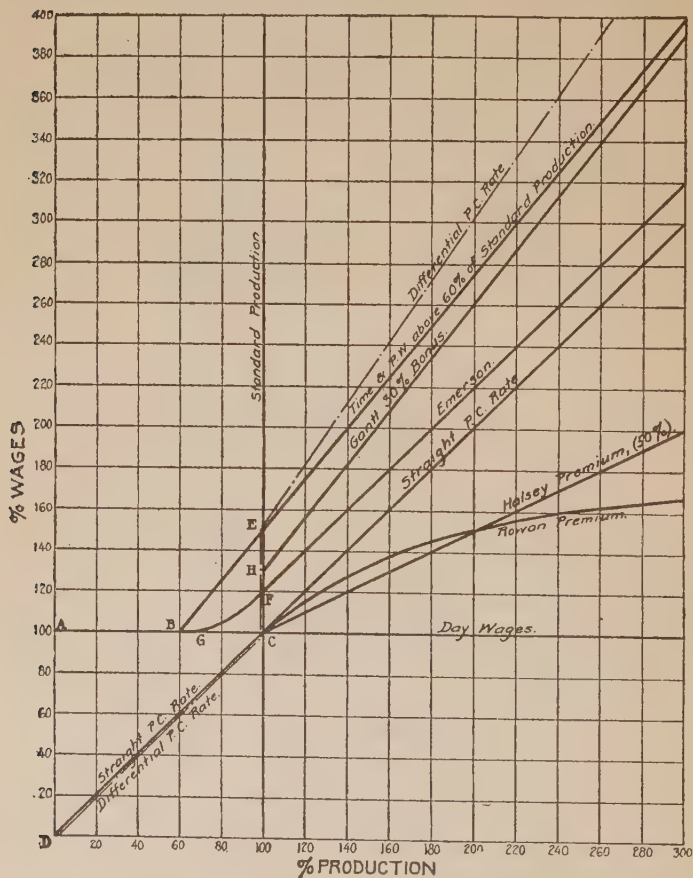


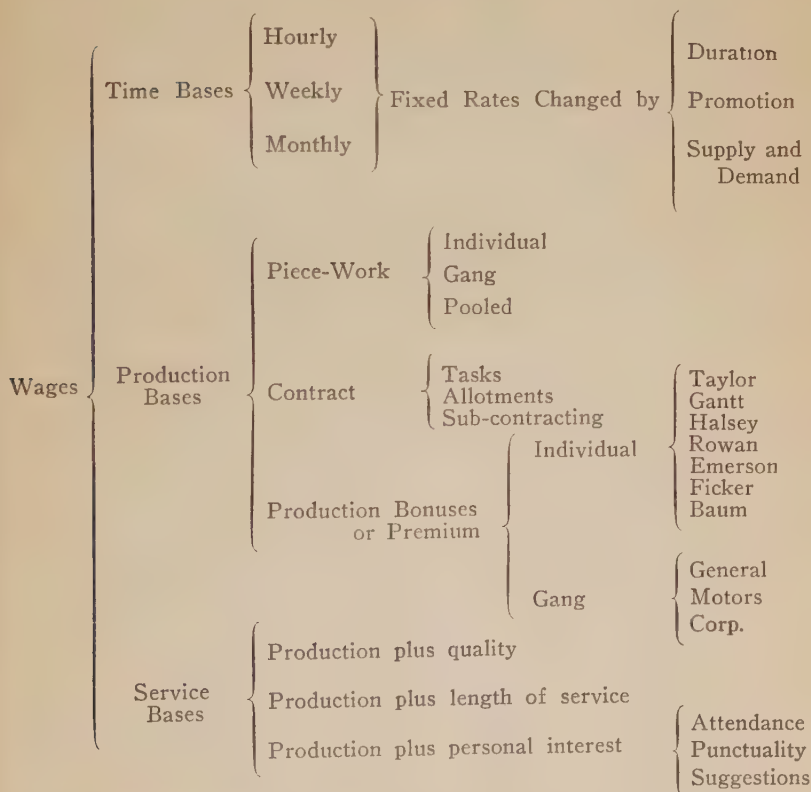
CHART OF WAGE SYSTEMS

day-wages at 100 per cent production; from then on it pays the percentage as shown.

The Halsey premium method pays day-wages (line A-C) until production is equal to the best previous record (here assumed to be 100 per cent). All increased output is paid in the proportion indicated.

The Rowan premium plan differs from the Halsey as indicated.

WAGE PLANS ¹



¹ From Circular No. 8. Bureau of Commercial and Industrial Relations, University of Wisconsin.

WAGE SYSTEMS AT THE WESTINGHOUSE
ELECTRIC COMPANY¹

The ideals of any plan are good wages and low unit cost, or those conditions which make for quality, quantity, minimum waste, and a satisfied body of workmen. The latter is by far the most important, as it is necessary to have a contented organization before the other results can be obtained. We believe the wage-payment plan which approaches these ideals the most closely is our "standard time" system. Before discussing this method let us review briefly the other Westinghouse wage-payment plans, which are day-work, piece-work, premium, group, and task-work.

More supervision is required on day-work than contract work, to see that employees produce a fair day's work, but closer inspection is required on contract basis to get quality. By contract work is meant any system other than straight day-work. All contract plans generally bring about greater quantity, lower unit cost, and greater ease in cost prediction and distribution than day-work.

Great precaution should be exercised when changing from one wage-payment plan to another. Such a change is a grave one and the conversion should be so planned that the workman earns as much or more than before.

There is likely to be a misunderstanding as to the meanings of several terms applied to our wage systems. Base time, as we use that term at the Westinghouse plant, is not standard time or time allowed, but the minimum time in which the best man can do a job under the best conditions. Standard time is that in which the average man can perform the job. Time allowed is that which is considered necessary to make a fair wage, or is the same as standard time in the task and bonus and standard-time systems. Time limits on premium work are generally about twice standard time.

¹ From the experiences of the Westinghouse Electric and Manufacturing Company. Factory. 25 : 1563-6. November 15, 1920.

THREE COMMON WAYS OF CALCULATING WAGES

1. Day-Work

Wages=rate $\times$ hours worked

Example: 50 cents=hourly rate

8=number of hours worked

Wages=8 $\times$ 0.50=\$4.00

2. Piece-Work

Wages=Number of pieces $\times$ price per piece

Example: 45 cents=price per piece

14=number pieces completed

Wages=14 $\times$ 0.45=\$6.30

3. Premium

Wages=premium rate $\times$ time taken+ $\frac{1}{2}$ premium
rate $\times$ (time allowed—time taken)

Example: 40 cents=premium rate

8 hours=time allowed

5 hours=time taken

Wages=.40 $\times$ 5+ $\frac{1}{2}$.40c. (8—5)=\$2.60

How Three Payment Plans Work

Day-work is the oldest plan, and probably still the most used. The oldest form with an incentive is piece-work; with the premium plans there is a considerably higher incentive

Now let us take up the various plans in detail, one at a time.

1. The oldest plan and perhaps the one most used today is that of day-work, wherein payment is made by the hour, day, week, or month. We pay for day-work by the hour.

More than 50 per cent of our shop employees are day-workers. Its simplicity makes it easy in figuring payrolls and easily understood by workmen. The lack of incentive is a drawback which retards quantity production and tends to slow up the fast worker to the pace of the slow. However, some incentive can be added in the form of increases as a recognition of individual ability. Day-work is flexible in so much as rates can be changed easily to comply with current prices paid for labor. It is difficult to proportion day-work costs. However, it is often the only method of adequately paying for work the nature of which changes rapidly

or where quality is the consideration of prime importance.

2. The oldest method of wage payment with an incentive is piece-work.

Piece-work, at right prices, effects quantity of production, ease in cost accounting and distribution, lower unit cost, and satisfaction and proportional wages among workmen. Too often piece-work-rates have been established by guesswork rather than by facts and scientific investigation.

When workmen made abnormal wages under improperly set piece-work-rates, the rates were cut and dissatisfaction followed. Unless the workers have unusual confidence they fear the cutting of piece-work prices and will not produce to the extent of their ability.

Workmen should be encouraged to make all they can and no cuts should be made unless the manufacturing methods are changed enough to warrant such action. For this reason piece-work is inflexible and very undesirable when it is necessary to make wage adjustments to take care of length of service, improved workmanship, and changes in the labor market. Many employers think they are paying for what they get on piece-work, but this is not true if employees loaf on the job. Indirect or overhead expenses are constant regardless of quantity of production.

Piece-work is best suited to departments where tools and methods are well standardized and where a large number of like pieces are produced. Piece-work is undesirable to the extent that it does not take care of the differences in individuals as to ability and spoiled work. Some workers are capable of doing a great variety of work or of building special parts.

When put on special jobs these men get no more than the specialists with their knowledge of only one or two jobs. Again, two men doing the same kind of work and turning out the same amount of product receive the same earnings regardless of the amount of material that one of the two might spoil.

3. In our premium plan a worker is paid for the actual time he takes on the job at his regular rate, and in addition he is paid at one-half his regular rate for any reduction in time allowed. The premium incentive is high, the guaranteed rate low, the unit cost small, the earnings fair, and the accounting complicated.

4. HOW WAGES ARE FIGURED BY THE GROUP PREMIUM PLAN					
	(a) Check Numbers	(b) Hours Worked	(c) Premium Rate	(i) Time paid for (b×h)	(j) Earnings (c×i)
	1	86	.30	133.5	40.05
	2	92	.36	143.	51.48
	3	98	.42	152.	63.84
	4	104	.48	161.5	77.52
Total		380		590.0	232.89
(d) Total time allowed, (from limit cards)=800 hours					
(e) Total premium time (d-b)=420 hours					
(f) Group share of premium time ($\frac{1}{2}$ of e)=210 hours					
(g) Total time (b+f)=590 hours					
(h) Percentage increase over time taken ($g \div b$)=155 per cent.					

A Plan With a High Incentive

When group production determines payment the better workmen will not tolerate the poorer ones. This plan encourages attendance, simplifies inspection, and provides supervision without extra cost.

4. An application of our premium system is that of premium payment on group work. The method of calculating the wages for each member of the group is clearly shown in the illustration above.

A number of workmen, preferably not exceeding ten, are grouped together under a leader. The leader attends to the supply of materials and tools, supervises the work, and helps with the work when not engaged on other duties.

A time limit is placed on each piece of apparatus. The earnings of each individual in the group are his hourly- or premium-rate multiplied by an increased time. This increased time is calculated by multiplying the time worked by each man by the ratio of

$$\frac{\text{time taken} + \frac{1}{2} (\text{time allowed} - \text{time taken})}{\text{time taken}}$$

Individual time slips are not used, as the time is calculated from check board readings or clock cards.

Group work eliminates poor or undependable workmen because the other members of the group will not tolerate loafing or incapability. It also simplifies accounting by eliminating individual time slips, encourages attendance, simplifies inspection, and provides its own supervision without extra cost.

5. WAGES BY THE TASK WORK PLAN

Wages = rate $\times$ hours worked (if task is not met)

Wages = 130% $\times$ rate $\times$ task (if task is met)

Example: 4 hours = task

40 cents = guaranteed rate.

Wages = $5 \times 40 = \$2.00$ if done in 5 hours

Wages = $130\% \times 40 \times 4 = \2.08 if done in 4 hours or less

A Plan With A High Incentive

The guarantee rate is too low to stimulate a poor worker. With good workers, however, this plan results in quantity production and high wages

5. Workers on the task plan are paid a bonus of 30 per cent if they perform the task in the time allowed, otherwise, they receive their guaranteed rate. The above illustration shows how wages are calculated by this plan.

One can readily see the high incentive to perform the task in the time allowed. Tasks should be very closely set so that only the efficient and those fitted for the work can make out. The guaranteed rate is so low that there is very little inducement for those who cannot meet the task.

Task accounting and cost distribution are comparatively simple and the system is easily understood by workmen. However, the guaranteed rate discourages

beginners to learn very difficult work. Task work, like other contract plans, makes for quantity production and high wages.

WHY THE STANDARD-TIME PLAN IS BETTER

6. THE STANDARD-TIME PLAN OF WAGE PAYMENT

Wages=Standard time $\times$ standard-time-rate (if work is done in standard time or less)

Wages=Time taken $\times$ day-rate (if work is not done in standard time)

Example: 54 cents=guaranteed day-rate

60 cents=standard-time-rate

4 hours=standard time

Wages= $4 \times .60 = \$2.40$ if work is done in standard time or less

If done in 2 hours, hourly earnings= $\$1.20$

Wages= $4\frac{1}{2} \times .54 = \2.43 if it takes $4\frac{1}{2}$ hours to do the job

The Company Favors This Plan

"Our standard-time plan has been established to overcome many disadvantages and combine the advantages of other wage-payment plans"

6. Our standard-time plan has been established to overcome many of the disadvantages and combine the advantages of our other wage-payment plans. Standard time is a reasonable time in which a job should be done by an average man. Labor is paid for at a prevailing day-work rate if a job is not done in standard time and a corresponding higher rate is paid if the work is done in standard time or less.

With the high guaranteed day-rate the earnings of the new man are higher than they would be under any of our other systems except straight day-work. This system is easily understood and very attractive. For example—a guaranteed rate of 35 cents per hour and 39 cents per hour for extra effort is more attractive to the new man than a guaranteed rate of 26 cents per hour

and 39 cents per hour for extra effort as in our premium system.

Let us make a comparison of the standard-time system with the premium, task and bonus systems.

Hourly earnings for the efficient man, or for the one who does a job in less than standard time, are greater than on premium work because the worker is paid for his increased efficiency at a higher rate than on premium.

The standard-time plan has a high day-rate and low incentive, and the task and bonus system has a lower day-rate and higher incentive. The fundamentals of both systems are similar.

7. A COMPARISON OF THE STANDARD-TIME AND PREMIUM WAGE-PAYMENT PLANS

	Premium Cost Per Operation	Standard Time Cost per Operation	Difference in Cost	% Decrease in Cost	Time Taken Premium Plan	Time Taken Standard Time Plan	Reduction in Time	Premium Earned Rate	Standard Time Earned Rate
	.159	.104	-.055	+34.6	.158	.098	.060	1.00	.93
	.055	.058	+.003	5.5	.073	.060	.013	.75	.91
	.263	.262	-.001	+ 0.4	.370	.276	.094	.71	.88
	.363	.347	-.016	+ 4.4	.551	.347	.204	.66	1.09
	.198	.128	-.070	+35.3	.230	.105	.125	.86	.935
	.137	.098	-.039	+28.4	.149	.114	.035	.84	.780
	4.040	3.680	-.360	+ 8.9	5.400	3.730	1.670	.748	1.026
	1.010	.923	-.087	+ 8.6	1.540	1.040	.500	.66	.906
Total	6,225	5,600	-.625		8,471	5,770	2,701		
Average				10.00				.778	.932

Average reduction in time 31.9 per cent.

Average decrease in cost of labor 10 per cent.

Average increase in earned rate 19.8 per cent.

How Two Different Plans Line Up

Comparing the standard-time with the premium plan shows how the first of these is better both for the company and for the employee. The table has been compiled from actual cost data in one of the departments.

The statements advanced in favor of our standard time are for the workmen's benefit, so that one might ask "Where does the company get off?" The table "Comparison of Standard Time and Premium Wage Payment Plans," above, shows the advantage of standard time to

the company as well as to the employee. The table has been compiled from actual cost data in the large industrial motor department.

This department recently changed several sections from premium to standard-time. The table shows that the time on the eight operations was reduced nearly 32 per cent, labor cost was decreased 10 per cent, and workmen's earnings increased by 20 per cent.

The system can be applied to any work on which it is possible to set a time limit. It is as flexible as day-work. On account of its simplicity it is easy for workmen to understand and makes accounting easy. The high day-rate is commensurate with prevailing rates in the community. Although the incentive appears small, an employee can earn at least as much as he could by putting forth the same effort on any of our other wage systems under the same working conditions.

Some people think that an employee who makes abnormal wages under a proper time limit should not be increased in pay. This is a fallacy, and one should bear in mind that the more one accomplishes in a given time, the cheaper will be the unit cost. This brings up the question of "going too fast." After reaching a certain rate of speed the wear and tear on men, machines, and tools is sufficient in turn to produce an increase in unit cost, so the whole problem of how much a man should produce simmers down to a matter of good judgment.

With wage-payment plans such as task and bonus, or standard-time, where the time limits are set very closely, all failures to meet the time should be carefully followed by some card or performance-chart system to determine the cause of failure.

An attempt has been made to show the advantages and disadvantages of the Westinghouse wage-payment systems. After all, the success of any system depends primarily on a knowledge of the correct time in which the jobs should be done.

WAGE SYSTEM	ADVANTAGES	DISADVANTAGES	METHOD OF CALCULATING
Day-Work	Simplicity; ease in accounting; easily understood by workmen; flexible; makes for quality; is easy to apply to variable work.	No incentive for quantity production; difficulty in cost prediction and distribution; makes fast worker slow; high unit cost.	DR=Day-rate H=Hours worked W=Wages $W=H \times DR$
Piece-Work	Simplicity; ease in accounting and cost distribution; effects quantity production and low labor cost; proportioning of wages according to amount done.	No guaranteed rate; not flexible; hard to change rates; makes dissatisfied workmen; requires close inspection.	PP=Price per piece N=Number of pieces W=Wages $W=N \times PP$
Premium	Effects small labor cost; agreeable to workmen; flexible.	Low guaranteed rate; unsatisfactory for beginner; makes complicated accounting; requires inspection.	PR=Premium-rate TA=Time allowed TT=Time taken W=Wages $W=PR (TT + \frac{1}{2}(TA - TT))$
Group Premium	Simplicity; ease in accounting; flexibility; high incentive; effects quantity production and low labor cost.	Complicated accounting; low guaranteed rate; not attractive to new men.	PR=Premium-rate TA=Time allowed TT=Time taken W=Wages $W=PR (TT + \frac{1}{2}(TA - TT))$
Task	Effects small labor cost; simplifies inspection; provides supervision at small cost; eliminates poor workmen and individual time slips; encourages attendance.	Requires inspection; low guaranteed rate; not attractive to new men.	TT=Time taken TR=Task-rate TA=Time allowed 30%=Bonus W=Wages $W=TA (TR + .3 TR)$ if task is met $W=TT \times TR$ if task is not met
Standard Time	High guaranteed day-rate; simplicity; easy for workmen to understand; high earnings; low cost; quantity production; ease in accounting and cost distribution; flexible.	Requires inspection; and a close follow-up when standard time is not met.	SR=Standard-Time-Rate TA=Time allowed DR=Guaranteed-rate HW=Hours worked W=Wages $W=SR \times TA$ if completed in standard time $W=DR \times HW$ if it is not met

How wages are calculated by the six plans used by the Westinghouse Company, and what the advantages and disadvantages of each are.

WAGE PAYMENT SYSTEMS IN MACHINE SHOPS¹

FACTORS INVOLVED IN DETERMINING WAGES

There are three factors involved in determining what the scale of wages ought to be. These are (1) the effect on the cost of production; (2) the effect on the employee; and (3) the possibility of applying a certain method of wage payment to the particular work in question. While there are a great many methods of wage payment, they can all be summarized into three main groups, as follows: (1) Paying a man for the *time* he spends at work; (2) paying for the *amount* of work done; and (3) sharing the profits of the work with the man. The first method is generally termed "day-work"; the second is some kind of piece work, and the third is a reward not only for the employee's direct work, but also for faithful service over a specified period of time. It consists of an annual distribution of profits, and makes it necessary that the man should have been with the concern for a period long enough to be entitled to share in such profits. In modern industry, paying a man for the amount of work he does is becoming more and more common; its various modifications being known as straight piece-work, premium, task-and-bonus, and standard time systems.

THE DAY-WORK METHOD OF WAGE PAYMENT

In the past, it has been the common practice to pay a fixed hourly- or daily-rate. In the machine industries today, when this system is used, the unit is the hour. The disadvantages of the day-work system are that, when no records are kept of the time taken on individual operations, each man on the same class of work

¹ By W. D. Stearns, Secretary of the Occupations and Rates Committee of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Machinery. 25 : 1115-16. August, 1919. Reprinted by permission. Copyright 1919, by the Industrial Press, New York.

receives the same wage, regardless of the work that he does. Consequently, the more efficient worker finds that he receives little more than men who do less work than he. If he is given a higher rate, his fellow-workers will be dissatisfied. If adequate records are not kept to show differences in performance, an increase in the rates paid to a few men is likely to cause trouble. The more industrious men become discouraged, cease to put forth extra effort, and soon fall to the level of the less able workers. It was doubtless this system that brought about the organization of labor unions, because the only way in which a man could increase his earnings to any extent was by obtaining higher wages for a whole group of men engaged on the same class of work.

When records of the performance of each man are kept, it is possible to determine when wage increases are justified, even with day-work. However, even then the increase in reward is not automatic, as it is under some form of piece-work, and there is no direct connection between the effort and the increased compensation.

ADVANTAGES OF THE DAY-WORK SYSTEM OF WAGE PAYMENT

On the other hand, the day-work system has several advantages, and in small plants employing not more than about one hundred men, where the manager is in close contact with every employee, the day-work method may prove satisfactory. It has the advantage of simplicity in keeping the payroll; it is easily understood by the employee; and it is believed that the inspection expense can be reduced, because there is no incentive for the workman to hurry and thereby slight his work. When special care and accuracy are required in work which should not be hurried and which cannot be easily inspected, day-work is doubtless the best method of paying for the service. There are certain jobs that require little more than the presence of the employee; these should

also be paid by day-rates. This class of work includes the operation of elevators, the firing of steam boilers, etc. There are also certain classes of work where the output is limited by the speed or the capacity of the machine and not by the effort of the operator; the day-work system is the one to employ in such instances. In addition, there are a number of cases where the work is not uniform in character, and where it is difficult to measure what would be a reasonable output in a given time. Patternmaking and toolmaking have been thought to come within this class, although, during recent years, some work of this kind has been placed on a piece-work, premium, or bonus basis, and this has resulted in increased earnings for the men and decreased labor cost for the manufacturer. In general, production will never rise to its possible limits under the day-work system. An incentive must be given for extra effort and one of the piece-work plans of wage payment will furnish this incentive.

CONTRACT SYSTEMS OF WAGE PAYMENT

The term "contract system" is used to include all systems in which the employee is paid for the *amount of work done* instead of for the *time spent* on the work. Any such system, to be successful, must provide all possible help to the employee in regard to machines, tools, materials, and instructions. The workman should be asked to perform only operations for which he has been especially trained, or with which he is familiar; while other labor should do the less important things in connection with the work, such as moving materials, getting tools, blueprints, etc. To obtain the best results, it is necessary that the employee be taught to perform the operations according to the methods determined by the careful study of experts. Furthermore, contract prices, when once established should not be changed unless the methods of

performing the operation are materially altered or unless there is a change in equipment or material.

Formerly, contract prices were established either from records of previous performances or from estimates by a foreman. Most of the dissatisfaction with contract rates on the part of the workmen has been due to incorrect prices determined in this manner without sufficient knowledge of the conditions. If the contract prices are cut as soon as a workman is able to earn a high wage, he naturally loses his desire to exert additional effort. He will make a studied effort to limit production to the maximum that he thinks is safe without having the price cut.

ADVANTAGES AND DISADVANTAGES OF STRAIGHT PIECE-WORK

In straight piece-work the amount due the workman is determined by multiplying the number of pieces completed by a set price per piece. In this system all the saving in direct labor cost goes to the workman, while the employer benefits by the increased production and the resulting decrease in overhead cost per unit of work. The main advantages of the piece-work system are the facility with which costs can be determined in advance; the ease with which the payroll is kept and the simplicity of the system to the workman. It is generally recommended that the straight piece-work system be applied only where the degree of skill is not an important factor, where the work can be inspected easily, where it is of a repetitive nature, and where the operations are few and simple.

The disadvantages of straight piece-work are: (1) It is difficult to apply when the operations are not fairly uniform over a considerable length of time; (2) it is not easily adjusted to take care of the fluctuations in the average price of labor; (3) it bears no relation to the value and the skill of the man, apart from his ability to perform a certain operation within a given time;

(4) the employee is not guaranteed a minimum day's pay; (5) adjustments cannot be easily made to take care of conditions beyond the operator's control, such as failure of power, breakdown of machines, and poor material.

METHODS OF OVERCOMING THE OBJECTIONS TO STRAIGHT PIECE-WORK

Various methods have been devised for overcoming some of the objections to straight piece-work. The fourth disadvantage, mentioned in the preceding paragraph, may be eliminated by establishing a day-rate for each employee, which is guaranteed to him. If for any reason, he is unable to earn as much by piece-work as the equivalent of this guaranteed rate, then he is paid at the guaranteed rate instead of at the piece-work-rate; in other words, he is always assured of a minimum pay per day.

A modification of the straight piece-work system is known as the differential piece-work method. This makes use of two piece-work rates for the same job. A standard time is established in which the job should be performed. If it is not performed in the standard time, or less, the lower of the two piece-work-rates will be paid, but if it is performed in standard time or less, then the higher rate will be paid. In this way, an additional incentive is given for increased effort.

GROUP SYSTEM OF WAGE PAYMENT

When a number of men work together, as in assembly work, it is difficult to pay piece-rates to each individual. In that case it is an advantage to consider them as a group under a gang boss. A maximum labor cost is then placed upon the work to be performed by them. When the work is finished, the total earnings of the group will be equal to the sum of the day-rate wages of each man plus half the difference between their wages and the

maximum labor cost estimated for the work. Each man's share in this additional bonus is proportional to his hourly-rate and the number of hours that he has worked on the job. Generally the individual is guaranteed a day-rate. This system is often used where the output of one workman is directly dependent upon the output of other men. Certain classes of foundry work, assembling operations, and riveting may be mentioned as examples of work which are adapted to the group system.

PREMIUM SYSTEM OF WAGE PAYMENT

In order to establish a premium system of wage payment, time studies are required for determining a standard time in which the work should be performed. This standard time should be the time required by an average operator working under average conditions. When the work is completed in less than the standard time, the operator is paid at a certain hourly-rate—the premium-rate—for the time saved, in addition to his regular rate. The premium-rate generally varies from 25 to 50 per cent of the regular hourly-rate.

As an example of this method, assume that the standard time for a piece of work is six hours, and that the workman is paid at the rate of 40 cents an hour. Assume, further, that the premium rate is 50 per cent of the regular rate, or 20 cents an hour. If the man performs this work in six hours, he will be paid at his regular hourly-rate, or $6 \times 0.40 = \$2.40$. If he performs it in four hours, he will be paid the hourly-rate for four hours, and, in addition, the premium-rate of 20 cents an hour for the two hours saved. His pay for the job would be $(4 \times 0.40) + (2 \times 0.20)$ or $1.60 + 0.40 = \$2$. This is for four hours' work, which makes his rate 50 cents an hour. His day-rate is always guaranteed so that should he require more than six hours in which to perform the job, he will still be paid his regular hourly-wage for the total time that he takes for the work.

The premium plan is a profit-sharing plan, under which the employer and the employee share in the gain from the increase in the output. The employer is justified in obtaining some of this gain, because the machines are used harder, and more power and supplies are employed. By dividing the profits, there is less incentive on the part of the employer to reduce the standard time in order to reduce the earnings of the workmen.

The most obvious advantage of the premium plan over the straight piece-work plan is that it permits of different hourly-rates for different men, and hence has more flexibility. When hourly-rates must be changed on account of changes in the labor market, the adjustments necessitated thereby are easily made, as the standard time remains the same and only the hourly-rates of the men are changed. The greatest disadvantage of the premium plan is that it involves more accounting work, necessitates careful time study, and involves the keeping of many records.

THE TASK AND BONUS PLAN OF WAGE PAYMENT

In the task and bonus plan the standard time is determined the same as in the premium plan, but instead of paying a premium-rate for the time saved, a bonus (from 25 to 50 per cent of the total wage paid for the standard time) is allowed the operator, if he completes his task in standard time or less. For example, suppose the standard time is six hours and the hourly-rate 40 cents. If the workman completes the work in five hours he will be paid for the full standard time, $6 \times 0.40 = \$2.40$, and in addition, a bonus of 25 per cent of this, or 60 cents. A guaranteed day-rate is always used in connection with this plan.

THE STANDARD TIME-RATE PLAN OF WAGE PAYMENT

After having studied and used all the preceding methods of wage payment, and taken into consideration

the advantages and disadvantages of each, the Westinghouse Electric & Manufacturing Company has decided to try, in some departments, a plan which differs somewhat from those ordinarily employed in other machine manufacturing plants. This new plan involves the following three principles.

1. Careful time studies to establish a standard time, which is the time in which an average man, under average conditions, can perform the work.

2. A day-rate, which is a fair amount for the class of work under consideration in the locality in question. This should be equal to the day-rate that would be paid for similar work if no other system of wage payment were used.

3. The application of a standard time-rate, which is a definite percentage higher than the day-rate.

In practice, this system works as follows: if the work is performed in standard time or less, the employee is paid the standard time-rate multiplied by the number of hours of standard time allowed for the job. If he does not perform the work in standard time, he is paid his day-rate multiplied by the number of hours required for the job. As an example, suppose that the standard time is six hours and the day-rate is 40 cents per hour. The standard time-rate may be taken as 10 per cent higher than the day rate, or 44 cents per hour. If the work is performed in five hours, the employee will be paid $6 \times 0.44 = \$2.64$, or 53 cents an hour. If it is performed in six hours, he will still be paid \$2.64, or 44 cents an hour; but if it is performed in seven hours he will be paid only his day-rate, or 40 cents an hour.

When this system is employed, it is important that records be kept of every case where a man is unable to perform the work in standard time, and that special records be made out by the time clerk and sent to the time-study man for investigation. After the investigation, the time-study man reports to the superintendent the reason why the operator failed to perform the work in standard time.

When this system is analyzed, it will be found that, if the employee is able to perform the work in standard time or less, he works on a straight piece-rate basis; but if he requires more than standard time for the performance of the job, then he works on a straight day-rate basis.

The principles upon which this scheme is founded are thought to be fundamentally correct. The two most important of these are high day-rate and a low incentive. All new employees have to begin on the day-work basis while learning the job. If the day-work rate is low, then one cannot expect to get the right type of man to undertake the job. A special instruction-period day-rate, higher than the regular day-rate, is only a makeshift, for when the employee becomes proficient, it does not seem fair to him that his day-work-rate should be decreased. A high day-rate is also needed on special short jobs, repair jobs, and instruction work, where a standard time cannot be easily established. Again, if a comparatively high incentive is allowed—perhaps from 30 to 50 per cent above the high day-rate—as soon as the worker becomes familiar with the work, his earnings are out of all proportion to the value of his services. He realizes this and tends to curb his production, so that his earnings may seem reasonable. When a lower incentive is adopted, care must be taken that the employee is aided in every possible way to work efficiently. This means that all retarding influences must be discovered and removed.

The system is only the tool. Its success or failure depends principally upon its being properly handled and supervised.

PAYMENT BY RESULTS¹

HOW THREE BRITISH PLANS WORK

Systems of "payment by results" cover a wide field, and apply to many trades; but I will confine my remarks to those systems applied to mechanical engineering.

¹ By H. A. Dudgeon, Works Manager, The Coventry Chain Company, Ltd. *Factory*. August 15, 1920. p. 535-6.

The principal systems and those best known are:

1. Piece-work.
2. Premium Bonus—Halsey's, Rowan's, and others.
3. Bonus on output.

All of these, properly applied, offer inducements to the employee to increase his earnings in return for an increase in output. We have all **three systems** in use in the works which I control.

It should be stated at the outset that no plan can be effectively applied, or full benefit obtained, unless the organization of the works is such as to insure that the plant is in good condition, that there are good and liberal supplies of small tools, good supplies of raw material, and a proper department for fixing operations and prices, whether these prices are for piece-work, premium bonus, or some other payment

The scheme most favored by employees and their unions is undoubtedly piece-work pure and simple, and it has much to commend it. The troubles in the past with it have been largely due to employers reducing prices when the employees have earned over a certain sum of money per week, this in its turn leading to employees restricting their output, so as to produce a certain sum **per week, and no more.**

The main objection to the piece-work plan in the past has been that, whereas an employer could perhaps well afford to pay the prices when originally fixed, competition, or other circumstances which occur sooner or later, compel a reduction in cost. The easy course, then, appears to be a reduction in the piece-work price, ignoring the fact, either wilfully or through insufficient data, that the wages item is often a small proportion of the selling price of an article and altogether losing sight of the fact that even a workingman, although he may be a trade unionist, is a reasonable human being, and is willing to listen to reason and allow an adjustment in price,

if it can be shown to him that the only way of profitably retaining the trade is by a reduction in the piece-work price. This assumes of course, that he is not asked to work for less than a reasonable percentage over his hourly-rate. In the piece-work plan, the employee feels that he is getting the whole of the benefit of increased production which is due to his own efforts, and he does not see why he should share this saving with his employer, a state of things which he thinks to exist when working under the premium bonus system.

With the premium bonus plan, it is agreed that the time saved when doing a given task shall be divided in certain portions between the employer and employee. It is the taking of the portion by the employer which the employee objects to, as he feels that any saving is due to his own effort and not to any effort on the part of his employer. The employee, however, apparently loses sight of the fact that in many shops an additional amount of time has been added to the job in the first place in order to provide some or all of the portion which goes to the employer. That this is the case, can be shown clearly in the following manner.

It should be fairly obvious that before a piece-price can be fixed, or a time allowance can be made, some calculation must be made of the actual time necessary to produce an article, and up to this stage there is no difference between whatever system of payment is adopted, whether piece-work, premium bonus, or any other.

Now assume that an hour has been found as a time necessary actually to do the work, and the hourly-wage of the employee is 36 cents (using the American equivalent of the British amount). For piece-work or premium bonus it is assumed the employee should be able to earn time and one-third. Therefore the piece-work price is fixed at 48 cents each.

Should the employee be working on the premium bonus system, in which the time saved is divided equally

between the employer and the employee, then the time allowed is fixed at one hour and 40 minutes, and as the task can be done in one hour, the employee is paid for 20 minutes' work in addition to his hour's work (which is time and one-third and equals 48 cents), and the employer retains the sum of money equal to the value of the other 20 minutes, or \$1.44. That the employer actually receives any portion of the money which should have gone to the employee, is a fallacy, as can be seen from the fact that the employer received back only what he had originally put on the job, and he does not rob his employee of anything.

A different state of affairs arises, however, if the task is done in less time than an hour, and we will assume as an extreme case that it is done in 30 minutes, or two articles per hour. As a piece-work job the employee will receive 96 cents for the hour's work, and the cost each will be 48 cents as before, but as a premium bonus job he will receive 78 cents. It is quite obvious that if it were possible to do the job in 30 minutes, there must have been something wrong with the time calculation for the job in the first instance, and as a piece-work job the employer feels justified in cutting the price, which, of course, was often done. As a premium bonus job, the cost has been reduced from 48 cents to 39 cents each; therefore the employer feels that, as the costs are going down, he is not so particular about altering the times, he also having in mind that although the costs have gone to a certain extent down, his employees' earnings per hour have increased from 48 cents to 78 cents.

Many schemes of bonus on output, both collective and individual, are in operation, and when properly applied often materially reduce the cost of work performed, and increase the earnings of the employees. Many of these schemes, in my opinion, do not achieve all the results they might, because of the fact that the reward or bonus

is not paid until sometime long after the work has been done.

A good scheme, therefore, should be one in which the bonus earned is paid as soon as possible after the work has been done. Further, where possible, the bonus should be paid on an employee's own efforts, or in the case of a foreman, or section foreman, on the production of those employees who are working under his direct control.

By paying a foreman on the output of his own section, payment can be made earlier for work done than if the bonus is paid on the completed article, for it can readily be seen that a patternmaker making patterns for a large marine engine would lose a certain amount of interest in the work if he knew that he was going to have to wait for his bonus until the engine was built and tested. He should, therefore, be paid the bonus as soon as the patterns are accepted.

Our works are divided into a number of sections, and the output and bonus is calculated each month for each section. Bonus to the foremen is then paid each week on the figures obtained for the previous month's work. That is, the bonus is paid each week in June on the output for May, and so on. Briefly, the scheme not only takes into account the output of the sections, but also the cost of any non-productive labor in that section, as follows.

The output is all paid as piece-work, and therefore the total prices paid are the measure of the quantity of the output over a given period. If this sum is divided by the number of productive-employee-hours—number of productive employees multiplied by the number of hours they have worked—a figure is obtained which is the value of output per productive employee-hour, and this figure becomes one factor in the bonus scheme.

A second factor is the ratio of productive labor to

non-productive labor in that section, which is obtained by dividing the total piece-work earnings, as figured above, by the total non-productive earnings for the same period.

The two factors multiplied together can represent any sum of money decided upon as bonus for a foreman at the commencement of the scheme; then as the factors vary in any subsequent month, the bonus varies accordingly. From this it will be readily seen that it is to the foreman's interest to: (1) Increase the output per employee-hour, (2) increase the ratio of productive labor to non-productive labor.

Since this bonus scheme was adopted, some two years ago, our records show that output per employee-hour has increased considerably over our pre-war output.

We also have a bonus scheme for handling steel in the stores, under which it was decided to pay a certain sum per ton for all material handled by the men engaged, this to be divided equally among them, except that the foreman was to have twice as much as any one of his men. It was decided that should more men be engaged, or the number of men be reduced, we would still pay the same bonus per ton. The result was that within one month of the starting of the scheme, 52 per cent more material was being handled by the same men. Each of the men was earning more, but the cost per ton to the firm, although the bonus scheme was an additional expense at first, was reduced 32 per cent.

A point to note in a bonus scheme of this kind, is not to pay a bonus of so much per man per ton. If you do, while it is possible the total bonus may decrease, the tendency would be for it to increase.

By the method we adopted, the bonus per ton remained constant, but there is a big inducement to increase the output per employee.

So far, my experience of bonus schemes has been quite satisfactory, not looked at only from an employers'

point of view, but from the employees' also. Each scheme, however, has to be specially considered and adapted to conditions in each works.

A PROCEDURE FOR A MINIMUM WAGE GUARANTEED PLAN¹

Primarily, the minimum wage guarantee plan is installed in order to reduce the number leaving employment.

When earnings fall below the minimum guarantee it is often for reasons for which the company is to blame, such as, faulty instruction; delays in giving out work; poor quality of condition of goods being worked; favoritism in giving out work; poor foremanship, etc. It might be considered that if any employee does not earn the minimum guarantee, it is the fault of the management and it should suffer, not the worker.

Furthermore, during the first weeks after an employee is placed on a piece-rate or merit system of pay, he is apt to fall down one or two weeks on his production. If he does not get a fair wage at such a time, he is very apt to get discouraged and leave. By paying a minimum guarantee at such a time, the chance of discouragement is minimized.

It is desirable, also that this plan automatically check each foreman on his success in training and handling employees and getting them to earn a reasonably satisfactory wage. Hence it emphasizes to the foreman his responsibility in keeping his work force up to its work.

PROCEDURE

1. Grade the various kinds of piece-work operations according to value, after considering such factors as skill required, time necessary for learning, danger and all

¹ Lesson material from War Emergency Course on Employment Management. University of Rochester. 1918.

other factors as far as possible and group the operations having about the same values.

2. Determine for each class of workers a reasonable minimum wage. This would, of course, be somewhat below the average actual earnings and somewhat below what would be considered the theoretically correct average wage or normal wage for the class. In justice, the theoretically correct average wage (which is set for each department in relation to every other department, all factors considered) should determine the minimum wage rather than the average actual earnings which obviously might be high for one department as against the other.

3. Now if a piece-worker earns, on full time in any week, less than the minimum guaranteed, the amount of the guarantee is paid and the foreman notified promptly that his department has been charged the difference. These records provide a weekly, monthly and annual record of the efficiency of each foreman in handling his men.

4. The records of minimum guarantees paid should be reviewed periodically by the Employment Manager, the Superintendent of Production, and the General Manager.

CHAPTER III

PIECE-WORK

THE PRINCIPLES THAT UNDERLIE PIECE-WORK ¹

The one fact underlying the philosophy of labor management is that it is not the workmen who are chiefly at fault for the inconsistency and inefficiency of most payroll disbursements, but the system generally used in handling the workmen. Under the system that oftenest exists we cannot expect the workman to be much different from what he is. If we were in his place, we should probably do as he does. We should want to make the best living we could for our families, and if by working honestly and conscientiously we could not make any more money, and if we had tried it over and over again, and still could not get any more, even though we did twice or three times as much as the poorer worker beside us, we should do the same thing the average worker now does; namely, come to the conclusion that the system under which we were working had no provision for compensating the individual according to his deserts, and that the only way we could get more money for our services was to get the wage-rate of our class raised, and take steps to this end.

* * *

In the term piece-work we include all the various schemes for compensating men for what they do, instead of for the amount of time they work. It may be divided into two general classes.

¹ From *Work, Wages, and Profits*, by H. L. Gantt, p. 77-87. Reprinted by courtesy of the Engineering Magazine Company, New York.

The first is that in which a price for a job is set from previous records or from the estimate of a foreman, who generally considers his duty done when he has set the price.

This method is the one in general use and until recently it has been almost exclusively employed. In recent years, however, it has been very generally modified in order to avoid the troubles that have so frequently followed such piece-work in the past. The following reasons seem to be amply sufficient to account for the labor troubles that have been caused by this kind of piece-work.

Records of what has been done are only a very poor indication of what can be done by a capable and industrious workman, and still may be far beyond the possibilities of an ordinary workman who has not had special training in the work.

Estimates of a busy foreman as to how long it should take to do a new job must necessarily be inaccurate, and rates set by his estimates are practically guesses. After the workmen have become skilled, their earnings will increase greatly and will often be out of all proportion to the exertion put forth.

Under these conditions an adjustment of the prices based on the new records is made; and, as the workman become more skillful, it is done again. Thus the more skilled the workman becomes, and the more progress he makes the greater the penalty he has to suffer, for his prices are being continually reduced so that he earns but little more than the incompetent man, who has never been able to do his work in such a manner as to exceed greatly the old records.

The effect of this method of penalizing the good workman in proportion to his increased effort is to discourage him so that he learns ultimately to limit his output by that of the poor workman. This result is so natural that we should not be surprised at it, nor should we condemn it, unless we make it to the interest of the work-

man to do otherwise. His desire for more money continues, however, and when he finds his piece-rate reduced whenever he earns much more than the average workman, he comes to the conclusion that as his employer seems determined to keep him in his class so far as compensation is concerned, he will see what he can do to better the financial condition of the class.

The fact that he has had to suffer a penalty for trying to advance himself by legitimate methods, however, has caused him to feel that might is more powerful in the world than right. No better way could possibly be taken to teach him the value of force in accomplishing his ends.

* * *

This brings us to the second system of piece-work, which when properly operated provides a complete system of instruction for the workman, equitable compensation for his efforts, and opportunity for advancement on his own merits, and not through "pull" or friendship. So far this system has never failed to create a strong spirit of harmony and cooperation.

The essentials of this system are:

1. To have the best expert available investigate in detail every piece of work, and find out the best method and the shortest time for doing it with the appliances to be had.
2. To develop a standard method for doing the work, and to set a maximum time which a good workman should need to accomplish it.
3. To find capable workmen, who can do the work in the time and manner set, or to teach an ordinary workman to do it.
4. Whenever the high efficiency is obtained, to compensate liberally not only the workman actually doing the work, but also those who supply him with materials and appliances to enable him to maintain the efficiency specified.
5. To find among the workmen who have learned the best ways of doing work, some that can investigate and

teach, and thus gradually to get recruits for the corps of experts, so that the system may be self-perpetuating.

6. The ordinary foreman of the shop must not be called upon to do the work of the expert. His business under the usual conditions of management is that of an executive, and he is invariably so busy attending to his routine duties that he has but little time to make investigations into the best methods of doing work. He can only give instructions according to the experience he has had in the past, or according to the knowledge he may pick up at odd times. Again, he frequently feels compelled to allow work to be done inefficiently because he has no man that can do it better, and no time to train a new man. For these reasons it is desirable that the development of methods, improved methods, and the training of workmen to perform these tasks, should be in the hands of some one other than the foreman.

For this purpose the best expert mechanic available should be selected. Such a man may not have qualities at all fitting him to be a foreman—in fact, the best expert usually makes but a poor foreman. He is generally so absorbed in the mechanical operations themselves that the improvement of them becomes a passion with him, and nothing pleases him more than to see a number of machines operating at their highest efficiency, the result of his work. On the other hand, the foreman with this kind of a mind often sacrifices other sources of efficiency for this object. The expert must be a good mechanic with fair education. He must have industry, originality, persistence, and an ability to remove obstacles, not once, but repeatedly.

Such an expert in a shop will study the machines individually and teach workmen to bring each up to its highest efficiency

While the policy advocated in the above paragraphs cannot be called a system of management, the elements described must be parts of any good system. Each individual problem of manufacture must be studied in such

a manner as to determine how the work can be done in the most efficient way.

There is no use in attempting to increase efficiency, however, unless it is done in a systematic manner. Managers will often tell you that you cannot put into their shops methods of this character, and, under the conditions that exist, they are right. In many places you cannot at once better the evident inefficiencies that exist, for the machinery is often so arranged that it is extremely difficult to do anything different from what is already being done.

Most plants have grown from small beginnings, and have been added to without any definite plan, or any real idea of the system to be used in operating them. In many cases the character of the work has changed, and a plant well adapted for one class of work may be so arranged as to make it impossible to do another class of work efficiently. Then there are plants in which the machinery has been arranged without considering the subject of efficient management. In most plants, at least one of the above conditions exists to such an extent that much of the machinery must be rearranged to make any great improvement.

Then there are some people who have no idea of doing anything in a systematic manner. They cannot do anything twice the same way. They may be very good people, with an artistic temperament, perhaps, or they may be chronic inventors. They like to change things. If you have a man like that at the head, and succeed once in getting the plant organized for efficient work, he will want to change things again to-morrow. Such a man is not a manufacturer, and will make a much greater success at something else. To attempt to make permanent improvement under such a system of management, is futile.

On the other hand, if the man at the head is systematic, and while capable of recognizing an improvement, is slow at making changes unless he can see distinct

benefit from them, the conditions for instituting such reforms as well as permanently adding to the efficiency of the plant are ideal.

When we have once established our system of management by which the work is done economically, and the workmen get higher pay, they themselves offer the strongest opposition to change, for they will stand by a good system under which they are benefited quite as staunchly as they did by the forty-year-old method it replaced, the only virtue of which, perhaps, was its age.

Before beginning to introduce the methods described we must study the conditions under which the work is to be done. The machinery must be so arranged that the work can be done economically, and provision must be made to have the proper materials and appliances always available for the workmen. This is a question of management and may have quite as much effect on the proper operation of a plant as anything the workmen can do.

PIECE-WORK AN EFFECTIVE METHOD ¹

Piece-work, is based on the sound economical principle that workers should be paid according to the value of their work. There is and can be no valid objection to the principle as such, but in practice it is less satisfactory. The invincible dislike of piece-work often shown by workers is not without justification. They complain that when a man increases his output by working harder, the employer cuts down the price and reaps the benefit; and it cannot be denied that this has often been done. Such conduct strikes a fatal blow at efficiency; it falsifies the whole principle of piece-work, destroys the capable worker's incentive and takes the heart out of him. Sometimes a trade union fixes a maximum day's work in order to avoid inviting a cut, and it is quite justified in

¹ From Arthur Shadwell's *Industrial Efficiency*, p. 390-4. Longmans Green & Company, New York, 1913. Reprinted by permission of the publishers.

doing so. One remedy is a standard price-list fixed by mutual arrangement and only modified by mutual consent. This generally presupposes organization, and the difficulty or impossibility of securing it without, is a very strong economic argument for trade unions. A second ground for objecting to piece-work is that, even with a fixed price-list, bad material or machinery may render it illusory in practice. Other grounds are less justifiable. One is sheer laziness. The shirker, who habitually does as little as possible, is at a disadvantage when earnings depend on work done. He prefers timework, which he can reduce to time waste, as far as supervision will allow him. The building trades offer the most conspicuous example of this kind of inefficiency, and it is noteworthy that labor disputes are far more frequent in them than in any other branch of industry. A theoretical objection to piece-work derived from vague socialistic notions of equality, looks better, but is really based on the same motive. It professes the aim of preventing competition and jealousy between workmen but this is the same thing as depriving the more capable and industrious of their qualities and bringing all down to the level of the least capable or industrious. That is not only false economy, but tyranny and injustice. It is idle to put forward such objections to piece-work in the face of its satisfactory working in innumerable flourishing trades.

The industrial value of the piece-work method of payment is, I think, clearly shown by the fact that it obtains in those branches of industry in which England retains her superiority, whereas time-work is more common in those wherein she has been caught up and surpassed. Two prominent instances will suffice to illustrate the point, and they are the two greatest of industries—cotton and engineering. I do not suggest that labour efficiency is the only factor, but no one can deny that it is one of the most important; and I do suggest that where the wage incentive has been of such a character as to stimulate the workers to do their best, there the lead which

England gained long ago has been maintained, not unimpaired, but still maintained; whereas, under the ordinary time-work system, which does not provide that incentive, but discourages effort, the once still greater lead has been entirely lost.

The inference is strengthened by the results of intensive piece-work wherein the stimulus of ordinary piece-work is increased by additional rewards. It takes different forms, but generally consists in paying each worker a higher price for each piece or job in proportion to the rapidity and quality of his workmanship. This automatically adjusts the incentive to the individual who has before him the choice of earning more or less according to capacity and industry. It is undoubtedly a most effective method of payment; it encourages workers to do their best, remunerates them directly for extra effort, pays the employer and benefits the whole concern on which both depend. The employer is able to pay higher wages for quicker work, because he gets a larger output for the same machine cost. He divides with the worker the advantage accruing from the difference.

Piece-work is not applicable to all trades; that is to say, it is not convenient to calculate wages on that basis, though of course in all cases the thing paid for is the result not the time spent on it, and in time-wages some estimate of the piece value of time is implied if not consciously realized. When machinery is running the ratio between time and result is generally regular enough to permit of its being reduced to a formula by a careful analysis of the operations. If this be done each can be expressed in terms of the other, and then the intensive or differential rate can be applied to time-work just as well as to piece-work. The two are interchangeable. In the Oldham spinning mills the output is calculated from the time and the differential rate is assessed by extra speed, so that actually time-wages are paid for piece-work. It is possible to reverse the process and pay piece-

wages for time-work, This is, in effect, what is done under the premium or premium bonus plan, which is now largely adopted in engineering and machinery works. The men are normally paid so much by the day or week, that is to say, they are on time-work, and in England, at least, they have a standard week's wage. This implies a certain output. All that has to be done to apply the intensive principles is to fix the relation between time and output more precisely and to offer additional pay for curtailment of the standard time required for a given result. The principle is exactly the same whether the measure be the piece or the time; in the one case the premium is paid for more output in a given time, in the other for less time expended on a given piece. The difference lies merely in the method of calculation, which depends on the nature of the work.

DEFECTS IN THE PIECE-RATE METHOD OF WAGE PAYMENT ¹

By piece-rates the unit of adjustment as between employer and employee is not so much time spent at labor, but so much work completed. The unit task may be of the most diverse kind in different occupations—a ton of coal mined, a locomotive mile run, a yard of cloth woven, a casting made, a certain area of type set, a face shaved or a head of hair cut. The fundamental idea of day-pay is that of mathematical equivalence between money and time; the fundamental idea of piece-work is that of mathematical equivalence between money and jobs.

If, for example, I am working as a journeyman hat-maker at day-wages, I tacitly accept the truth of the proposition that ten hours of my time are worth, say, \$2.

¹ From *Principles of Industrial Engineering* by Charles B. Going. McGraw-Hill Book Company. New York. p. 120-5. Reprinted by permission of the publishers.

That is, I agree with my employer upon the truth of this equation:

$$(A) \text{ 10 hours time} = \$2.00$$

I come into the shop at seven, go home at six, with an hour for lunch. I loaf as much as I dare; the boss watches me and drives me as much as he can, and perhaps in the average I make about one hat a day. Now suppose I go on to piece-work. I set in the background the proposition "ten hours equals \$2," and base my creed upon the tenet that "making one hat equals \$2." In other words, my employer and I fix our eyes on a new equation:

$$(B) \text{ Making one hat} = \$2.00$$

The longer I dawdle, the longer it takes me to get that \$2. On the other hand, if I work fast I can perhaps get through by mid-afternoon or even earlier and go fishing. Or if I choose to stay I can begin on another hat. Very possibly by diligence and study I can improve the tools or the operations a little, or I may carry on the making of two hats at once, working on each during necessary pauses for the maturing of processes on the other; and I may soon be turning out three hats in two days or even two hats in one day. The boss will be paying me 50 per cent to 100 per cent more wages in a given time than he did formerly. Yet his hats, are costing him no more. Indeed, they are costing him less, for his general expenses for shop rent, light, heat, superintendence (that "overhead burden" of which we have already spoken) are no greater than they were before, and yet he is turning out more hats to absorb these charges. A smaller fraction of this cost, therefore, attaches to each hat.

Now I said that in going on to piece-rates the boss and I both set in the background the proposition that ten hours equal \$2. I used those particular words advisedly, because that idea at best is only retired. It is not dismissed. It lurks in the background of our minds

persistently. The price of \$2 per hat was fixed as a piece-rate not because we really believed it was worth \$2 to make a hat, but because on the average that paid me \$2 for a day's time. In other words, we accepted formula (B) not because we believed in its abstract truth, but because we believe this:

(C) Making one hat = 10 hours time

As soon as (C) proves untrue, (B) no longer follows from (A) and my employer at least loses faith in it. When I begin to get \$3 a day the boss begins to get uneasy, and when I make \$4 a day he is probably certain that something is wrong. He believes no journeyman's time is worth \$4 a day. The fact that he is turning out larger product from his shop in the same time at less cost does not impress him as it should while the \$4 a day to a "\$2 man" looks enormous. He begins to believe that he is paying too much for the making of a hat. Probably he decides that if two hats can be made in one day, the making of a hat is not worth more than \$1, and he cuts my piece-rate in half. I have to work twice as hard as I did before and get no more for it. On the other side, my fellow workmen are displeased. They are contented with the old order and want to work along turning out about one hat a day and getting \$2 for the day's time. They say "if you show the boss that two hats can be made in a day, he will want to drive us up to your pitch or get rid of us. You are killing the job." So these two influences combine to discourage me against the great and apparently fortunate incentive which first led me to rejoice in the piece-rate and to see so much apparent advantage in it.

Piece-rate payment is an old idea. We find it far back in the history of the guilds, and no doubt it existed centuries before that. Within comparatively recent times, however, it has been brought into new prominence through the earnest efforts of men who saw in it a great light to lighten the way out of the darkness of day-wages.

It offered an incentive to the worker, a reward proportioned to his skill and industry, an enlarged output induced by this financially stimulated activity, and the very essential result of increased volume of manufacture with decreased cost of product from the same plant investment. Results—important results—have been secured; but yet they have frequently been disappointingly below expectations, chiefly for the reasons suggested in my little parable of the hat-maker.

The great inherent trouble is the difficulty (under ordinary or non-scientific management) of fixing piece-prices which are fair and which continue to be fair. The reserve capacity which a workman may be holding back, consciously or unconsciously, in an operation that has not been scientifically studied and standardized, is almost unforetrollable. When it is realized under the incentive of piece-payment, and his earnings rise enormously, the disposition of the wage-payer to rebel against the outlay and to cut down the piece-price is almost irresistible. If the employer sees that a workman can do several times as much as he was doing under day-wages, you can hardly blame him for feeling that he has been defrauded all along under the old system, and for trying to make things more even from his point of view. But the price-cutting that has so very, very often followed soon after unscientific price-setting has worked immense mischief, by raising in the minds of the men suspicion and distrust of systems introduced to replace the old day-wage plan. Union opposition has been strong against piece-rates, and while it has been modified in many places so as to admit piece-work, this acceptance has often been accompanied by counter-restrictions which nullify most of the possible advantage—as, for example, the fixation of a very moderate number of pieces as the maximum that any man may make in a day, thereby coming back substantially to day-wages.

The trouble here, however, is not so much one of

principle as one of administration; but there is a fault of principle inherent in piece-rates, and that is that they put all the uncertainties of production on the workmen. Suppose a man is machining steel castings at so much per piece. He may have delivered to him a lot of hard metal parts that take four or five times the expected time to finish. For that period, at least, he cannot make living wages. Suppose a gang is unloading coal cars at so much per ton, and the switching crew is tardy in moving away empties and setting in loaded cars, and so keeps them idle for considerable periods, or suppose that in setting in the new cars it places them badly so that the men have an extra long throw and work at a disadvantage. Again, the workmen may be unable to make fair wages, through no fault of their own. Suppose, once more, a working gang is made up by the foreman so that green men are mixed with skilled, and these green men by their awkwardness cut down the output of the whole gang. Here, again, if they are working at piece-rates, their earnings are reduced without their fault.

In all such cases, unless there is special intervention by someone in authority to make up the loss, it falls upon the piece-rate worker. Under day pay, of course, it would be the employer who would suffer in such cases; but the employer is in the first place better able to stand the loss. The unprofitable item of work is probably only one of many he has in hand, while to the workman it is the worker's entire interest; and last, and most important, the whole power to remove the conditions that caused the loss rested with the employer and not with the workman.

Notwithstanding these certain defects of principle and administration, however, piece-rates are a good deal used. Where the rates are carefully and fairly set, by fair and frank effort on the part of both employer and employee to make them right, and where they are fairly maintained after they have been set, they are often (almost usually)

preferred by the men; for they make the man more the master of his own time, and they enable the capable workman to increase his earnings in correspondence with his ability and capacity. Where the men will work fairly under the piece-rates they are liked by employers also because the system stimulates larger production from the same plant without materially increasing the indirect operating expenses. These are the advantages of the piece-rate system—increased output and increased earnings. Its disadvantages are that when difficulties interfere with output the men's loss is not made up to them without special action by the employer; and, worst of all, that when the employees' earnings are very much increased the employer can seldom resist the temptation to cut the rate. Knowing this, the men are frequently suspicious and seldom let themselves out to anything like their real capacity.

The "contract plan" of employing and paying labor is used to some extent, especially in heavy machine-shops, that is, locomotive and shipbuilding plants, in the United States and Great Britain. It is not, however, a separate and distinct system, but is substantially a gang piece-rate. An over-all price for a job is agreed upon with the contractor, who uses the equipment and facilities of the employing shop, but hires his own workers and assistants on terms arranged between him and them. As discipline and responsibility thus fall chiefly on the contractor, while the tools, facilities and general environment are largely supplied by the shop, the plan leads to a somewhat demoralizing divorce of authority and liability. It is likely to lead, and in practice it does lead, to very bad industrial conditions. Nevertheless it has been in use for a long time, and remains in use, and hence must be considered a practical and to an extent commercially successful method, although the success is not determined by very high standards.

WHY PIECE-WORK IS NOT SATISFACTORY ¹

The real objection to piece-work cannot be fairly laid at the door of the workman, but rather to the outrageous conduct of short-sighted proprietors, who have constantly cut the piece-work prices, even when an agreement had been entered into that no cuts would be made, and this naturally engenders a feeling in the heart of the workman that he will not get fair treatment. Conditions often arise to make it absolutely necessary to reduce piece-work prices, and in such cases I have found workman perfectly willing to accept a change. They do so, however, always with the feeling that they could not hope for fair consideration if new conditions were to arise which would justify an upward change. It is always a downward change for the workman, so as a matter of precaution he keeps some force in reserve to use when it comes to a pinch. With this feeling it is evident that no peak production can be obtained and maintained.

OBJECTIONS TO THE PIECE-RATE METHOD
OF WAGE PAYMENT ²

1. PRACTICAL OBJECTIONS

Workers generally hate piece-rates, and oppose them. Piece-rates therefore widen the existing breach and cause misunderstandings between employers and workers. They curtail output and prevent cost reductions.

Tool, machine, material, weather, temperature, humidity, light, volume, all very greatly influence output.

Because all these conditions may vary exceedingly from day to day, a piece-rate must be crude and soft,

¹ By W. D. Forbes. *American Machinist*. 52 : 612. March 18, 1920.

² By Harrington Emerson. *Industrial Management*. June, 1919, p. 471-2.

like an Indian's blanket, instead of being well adapted, like a baseball player's suit.

Piece-rates have to be very easy to go in at all.

2. ADMINISTRATIVE OBJECTIONS

Piece-rates lessen the responsibility of the management, who should bear it, together with control, and throw it on the worker where it does not belong, and, as a consequence he demands more control.

Piece-rates introduce an inflexible system of vested rights, a most dangerous condition to fasten on a modern plant. No rate whatever ought to have any permanence. No time schedule has. There may be 50 time schedules for the same operation and they may all automatically lapse overnight.

Labor costs are always only a part of total costs, often a wholly insignificant and subordinate one. Piece-rates magnify a detail to the detriment of the whole.

Every executive, from worker himself up, should understand the end, the aim, the ideal, and not sacrifice it to his petty function.

3. PSYCHOLOGICAL OBJECTIONS

The words "piece-rate" are as a red rag to the worker. There is instinctive and latent hostility to them. However fair they might be, many injustices and abuses have occurred until they have come to be regarded as a device for increasing toil and reducing pay.

I know a very large American plant, with an international business, in which piece-rates were revised every year to the basis of the lowest current wage for the highest 10-hour record. As a consequence, a great horde of ignorant foreigners came to their piece-work between 4 a. m. and 5 a. m. in order to earn a living wage by 6 p. m.

When I go into a shop to gain the cooperative

confidence of the worker I do not want to begin by throwing at him a hated method of check and payment. He hates piece-rates because his income is uncertain but his expenses are definite, and any day, through conditions beyond his control, piece-rate earnings may drop to nothing.

But there is an even deeper psychology. We all feel interested in reducing time, but not in reeling off more pieces.

Thousands will go to see a horse lower the trotting record half a second, but nobody feels any interest to see him go ten yards further in a minute. We all felt interest in the reduction of transatlantic steamer records but not in the more useful feat of a long voyage without coaling.

If a time standard is set up men will instinctively try to beat it. If a piece-standard is set up they will stand pat. Ask a man to walk as many miles as he can in eight hours and he will get ideas of beating the professional record. Give him a standard of twenty miles and he may attain it in five or in ten hours, but he will stop when he has done the stunt. Therefore a time schedule is generally very effective in reducing cost and increasing pay and output.

Under "Practical Objections" I have already referred to the undesirability of throwing the responsibility for output on the worker, as piece-rates do, instead of on the foremen and superintendents as time-schedules do.

A machinist in a Santa Fé shop could not make his time-schedule (the casting was unusually and abnormally hard). This immediately resulted in dragging in the worker, the foreman, the superintendent, the man who had made the schedule, the shop accountant, the purchasing agent, the vice president. The immediate results were:

1. A reduction in cost of the specific operation from \$23 to \$3.

2. A saving as to this one job of 20 days of locomotive time at \$50 a day or \$1,000.
3. An improvement in all castings for all purposes.

COMMON USE OF TIME SCHEDULES

All railroads have time schedules, not piece-schedules, for operating their locomotives. The management must maintain the way and track as well as the locomotive so that the locomotive can make its time.

It was familiarity with railroad operation time schedules that led us to evolve the same method for shop and other operations. It is noteworthy that railroads have never had any serious difficulty in changing and bettering their time schedules, but they have always had immense difficulties with their piece-rate schedules, whether applied to freight or to employees or to shop work.

For eleven years after we had supervised the installation of time schedules for twelve thousand men in twenty different trades, men scattered through twelve states and of fifty-six different nationalities, including Indians, Mexicans, Chinese and Japanese, there was not a breath of trouble, because time schedules are flexible. All around us on other railroads there were piece-rate troubles.

A TRUE STORY, ILLUSTRATING THE PSYCHOLOGY OF PIECE-RATES VERSUS TIME SCHEDULES

A skilled machinist at one big locomotive shop was shaping frames on a piece-rate of \$12. At another shop the same operation was performed on time schedule for \$6. This being brought to the attention of the superintendent, he suggested to the worker that the \$12 rate ought to be trimmed. The machinist's reply was that if an attempt was made to reduce the piece-rate the whole shop would strike.

As this was highly undesirable nothing was done for several months, but as the other shop continued, with entire satisfaction to all concerned, to turn out the frames at a cost of \$6, the matter was finally placed in the hands of a time specialist.

The successive steps were:

To find out the average hourly earnings of the machinist on piece-rate for the previous six months.

To offer the machinist this average hourly earning as guaranteed hourly wages. (This was accepted by the machinist.)

To abolish the piece-rates. (This was also accepted.)

To install, with the superintendent's and foremen's help and cooperation standardized conditions as to tools, power, belting, crane service, etc.

To install, with machinist's assistance:

Standardized operations as to jigs, cutting speed, feeds, depths.

To set up a time schedule for the operation under the improved conditions.

As a consequence, the machinist who was going to bring on a general strike if his piece-rate of \$12 was touched, cut the actual cost to \$5.80, earned more, more easily, but more skillfully than ever before.

Other illustrations could be given by the hundreds.

Even the villainous piece-rates, the end result of many years of unjust oppression, which forced some workers to come at 4 a. m., could have been put on time schedules which would have reduced the hours, increased the pay, lessened the cost, increased the output.

The time schedule method consists:

1. In paying a regular rate per hour, agreed to between contracting parties.

2. In setting up a standard equivalent in output for the hour of work, and recording the time of every performance.

3. In making the management responsible for those standardized conditions and operations as will make the output normally and reasonably possible in the time set.

4. Recognizing the worker's right to all the time he saves below normal equivalent.

He can use it to rest or he can use it for work and be paid for it on the next job.

He has the same right to the time he has saved as those smarties had, who in plants working three shifts, worked under one name on one shift and under another name, in a different department, on another shift; with this difference, that we object even more to overtime than we do to piece-rates.

5. In not disturbing the guaranteed minimum hour-rate, but increase the rate as standard is approached, increase the rate very much as standard is passed.

A DEFENSE OF THE PIECE-RATE METHOD ¹

1. There are no practical, administrative or psychological objections to any piece-rate system in vogue that cannot be removed by a right-minded management. Where they exist at all the piece-rate system is not thoroughly understood and a house-cleaning is necessary.

2. The piece-rate method of wage payment:

- (a) Is fairest to worker and management.
- (b) Rewards the worker the most for superior ability.
- (c) Is easiest to modify in a labor trouble emergency.
- (d) Most certainly insures balanced production.
- (e) Is scientific, unarbitrary and hence sound.

3. The time schedule method of wage payment is based on a novel idea for which too much is hoped. As

¹ By Leon Blog. *Industrial Management*. October, 1919. p. 327.

he has done with all other systems of production co-axers, the worker will soon detect this one if it be installed, and it will also become a red rag whether deservedly or not. Its bonus nature will bring on all the troubles incidental to bonus systems and a speedy return to a scientifically established piece-rate method of wage payment will be the remedy.

WASTE SAVING THROUGH PIECE-WORK¹

In these days of increasing agitation for economical methods of manufacture, perhaps the element that receives the most universal attention is that of labor. This is not to say that there are not other elements of very large importance from the standpoint of possibilities of economy in every business, and indeed, in some plants, of greater economical significance than labor. But in the first place many of these other elements have received, and are receiving, in a progressive systematic manner, such attention as to bring not only constant improvement, but (which is really very much more to be desired in the plan of things) to open up still larger fields of returns for human effort. And in the second place the quick returns on intelligent action, the human interest involved, the increasing profit that lies in volume of production, the unlimited possibilities of increase of product per hour that every man seems capable of developing, and, perhaps not a little, the fact that in any plant more energies and brains become immediately interested and active when the element of labor is dealt with, make it of supreme interest.

And so we are developing the possibilities of this element through motion studies and scientific analysis, and coaxing it on through its human side by the incentives

¹ From *Experiences in Efficiency* by Benjamin A. Franklin. Engineering Magazine Company. 1915. p. 32-41. Reprinted by permission of the author and publishers.

of piece-work, premium plans, bonus methods, efficiency standards, etc., with economical results as to cost, and with a hope that in the long run, all this will lead to decreasing selling prices. But there are those who think that this latter could be radically effected much more quickly by a decrease in the tariff, the discovery of a plan of distribution more direct, or a law-compelled or heaven-sent abnegation on the part of capital of all unreasonable profits.

However, to return to labor, it must be acknowledged that very good economical results are being obtained by the various studies and methods employed, and that a new era of labor values is being developed. It cannot be denied that too often the incentive back of the introduction of these modern methods in labor handling is solely the narrow one of plant profit, and not the broader one of mutual benefit to labor and capital alike. Yet it is a fact of observation that when these methods of incentive have been introduced with a sense of fairness and appreciation of the full and continuous rights of labor, the net results to capital have been even greater than when the work was done in a narrow way, since such operation has aroused the most liberal spirit of friendly cooperation, which is most absolutely and essentially the true basis of all of these methods. And it is not to be doubted that through such a spirit of cooperation lies a development of this great problem that will lead to utopian results.

But in all this effort to increase the product per man-hour, quality must not be forgotten. In the matter of moving materials, of much rough work, and even of a good deal of work with precision and automatic tools, haste does not make waste nor affect the desired quality. But there are many operations and articles where judgment and care play a material part in the items of quality and waste, and the unquestionable tendency of haste is to deteriorate.

This latter is the statement that is met when methods of labor payment according to product are suggested to the manufacturer who is proud of the high grade of his product, and who guards, as the secret of his profits, against any tendency toward deterioration. And certainly no advance is made, either from a profit point of view when one element of cost is decreased at the later expense of the selling price, or from a broader materialistic point of view when a poorer article is made from good material which care would make into a better article.

One hears much complaint, whether with a true basis or not, that workmen are not so skilled, so careful, as they used to be; that articles are not put together so solidly and well as formerly. If this is true, as indeed it may be in cases, it is only fair to labor to say that it is probably more the fault of the design, the plan, the attempt to imitate cheaply some popular or high-priced article, or perhaps even more than these the different divisions and training of labor, brought about by modern methods, than the fault of labor itself. Nevertheless, some years of experience in many varied industries have left the conviction that quality is a matter of insistence, rather than of methods of either day- or piece-work. That is to say, that in that plant where a given standard of quality is insisted upon, the workmen will work on piece-work basis.

To obviate any danger of retrogression in quality and loss through waste by possible carelessness on the part of workmen hastening toward daily increase of production on account of the rewards offered by the piece-work or other plan, the writer, working as a business economist, devised and put successfully into operation in several plants a plan of piece-work in which the rate varies with the quality and per cent of waste, so that the daily pay of the operator depends not merely upon the quantity done per day, but very largely on the quality of the work.

There are many articles the manufacture of which, both as to quality and the waste of raw materials, can be gauged very accurately; in which no great scope of judgment is allowed; in which accurate measurement and prearranged jigs and tools play a guiding and correcting part. There is little chance for judgment or waste, except through punishable carelessness, in the work of machining to blue-print size a casting perhaps with jigs and fixtures. Here, and in many like cases, piece-work finds a safe economy.

But there are many operations in very many staple businesses where haste and carelessness may spoil much material, or where care and interest may save more in material than the total wages of the worker. In these cases the executive naturally hesitates to reward speed and volume of production, because of a fear that his loss in waste will be greater than his gain in labor cost.

In such cases the executive will find "quality piece-work" a valuable method.

A practical case will illustrate this method. In a large mill an important operation involved the pasting together of sheets of material. This operation developed a large tendency toward imperfections of various kinds, not only those arising from the spoiling of the material in pasting, but others due to further enlargement of defects during the drying and finishing operations—defects which careful pasting might avoid. The value of the material was such that its waste was a very considerable matter. Quality was the most important element to be considered.

Even on the day-work plan, it was the custom to sort over the material, so that the imperfect sheets were eliminated to be pasted separately. The pasting gang, therefore, started with presumably perfect stock, offering a fair basis for waste-gauging.

Starting with perfect material, there were two losses to guard against. The first was the turning of perfect sheets, through poor workmanship, into sheets, not imper-

fect enough for waste, but so defective as to bring a lower selling price. The second waste was that absolute one where only a scrap value remained. The scheme put into effect must take care of reward for speed, but a reward so proportioned that the most careful and skilled gang obtained a large return for good work, while poor work carried penalties in reduced rewards which forced out poor workmanship.

The detail of the method on this case was as follows. A standard ratio of imperfect pasted sheets to perfect pasted sheets was fixed, as well as a standard percentage of total waste. These standards were, of course, the result of records and experience.

The rate was based primarily on the percentage of imperfection. While the figures given below are not exact, the following table shows in a general way how the rates look:

\$1.12	per	100	pastings	at	$2\frac{1}{2}$	per	cent	imperfect
1.10	"	"	"	"	3	"	"	"
1.08	"	"	"	"	$3\frac{1}{2}$	"	"	"
1.06	"	"	"	"	4	"	"	"
1.04	"	"	"	"	$4\frac{1}{2}$	"	"	"
1.00	"	"	"	"	5	"	"	"
.98	"	"	"	"	$5\frac{1}{2}$	"	"	"
.96	"	"	"	"	6	"	"	"
.94	"	"	"	"	$6\frac{1}{2}$	"	"	"
.92	"	"	"	"	7	"	"	"
.90	"	"	"	"	$7\frac{1}{2}$	"	"	"

In addition, the waste is set at 1 per cent, and a fixed bonus per 100 pounds arranged for every $1/10$ per cent reduction, or a deduction for every $1/10$ per cent increase in this amount for the week.

The results in saving to the company in imperfect and waste, and the weekly increase of production, have been very well worth while indeed, and the employees have benefited 25 per cent to 50 per cent in increase in wages; one operator indeed for some years having averaged nearly 100 per cent increase over the old rate. The judgment as to the quality of the sheets pasted lies in the

hands of people so far away from the pasters that there can be no question of its fairness to both the company and the workmen. The pasted sheets go through other operations and are sorted out as to quality when they are put up in final counted packages.

This example has been given in some detail in order to make clear by figures the method employed. The same method has proven applicable in many cases where judgment, carefulness, and attention could get more of an article out of a given quantity of raw material, with less waste, than the ordinary methods of supervision and labor pay will obtain, and it has been especially valuable in the case of leather.

Three elements in the operation of quality piece-work are:

- 1 To find operations in which waste is to be saved or quality bettered by care.
2. To find by observation and data what can be done per hour on the quantity basis.
3. To find what the average waste or standard quality is as a base for quality rate.

There have already been some important developments of this quality piece-work in several factories. It can be applied with careful study to any operation where waste is to be saved or quality bettered.

Important from the point of economy as a reduction of labor unit cost may be, the struggle for speed cannot last without a full accounting with quality, and the betterment of quality and saving of waste will take its place in the progress of the world as a good second with the betterment of morals and social practice, and indeed has an effective place in their progress. Perhaps the next step in the progress of increasing per hour production in manufacture by means of extra wage incentive will be the betterment of quality through quality piece-work.

GANG PIECE-WORK ¹

Piece-work, founded on the ancient business principle of barter and trade, of giving a stipulated price for a stipulated article, is an old institution, in principle and practice well known by both capital and labor. And while there rests in the minds of very many (whose interests would be much better served by knowledge) a considerable ignorance of the significance of differential rates, premium plans, etc., every manufacturer knows of straight piece-work, and most of them believe that their factories are operated to a very percentage on that method of payment.

Yet actual experience with a great many manufacturing plants shows that, if the payroll is consulted week after week, it will bear witness in the average plant to no such condition, but will usually prove that in the several departments, all labor considered, there is from 10 per cent to 75 per cent piece-work, none too often reading up to the higher mark.

It is true that manufacturers are beginning to be more susceptible to the call of increased labor-efficiency. The propagandists of scientific management are beginning to be listened to somewhat more respectfully, as the message of increased efficiency is a joyful one to the ear of the American business man, when he can be persuaded that it applies in some practical way to his particular case. And it may be believed that the agitation about the \$1,000,000 a day loss by the railroads will do more than any recent occurrence to urge manufacturers farther along these lines, not only by calling the matter strongly to their attention, but also by that happy trick of our human natures that makes many of us hasten, sometimes

¹ From *Experiences in Efficiency* by Benjamin A. Franklin, Engineering Magazine Company. 1915. p. 32-41. Reprinted by permission of the author and publisher.

unconsciously, to correct or improve when the fault or opportunity is shown to exist in another.

But that manufacturer who desires to operate his labor on piece-work has still, on the average, a definite opportunity of obtaining a real increased efficiency in developing this method of payment to the highest degree by getting his whole factory working on this plan. It is not impossible in many factories to get almost 100 per cent of the total labor, even including the foremen in most departments, on piece-work. To accomplish this, however, it is not infrequently necessary to depart from that method of piece-work whereby a fixed rate for a given operation on a given article is paid to an individual, or what might be called "Individual piece-work."

A most effective method of departure lies in gang piece-work.

The term "gang piece-work" does not here signify that form of labor payment which is not now in as great practice as it once was, and which deserves a grave in the cemetery of discarded methods, viz., the method by which work is farmed out for a given sum, to a foreman or subcontractor working generally inside the plant, who in turn hires and pays his own labor according to his own ideas. Such a method holds in it no real economy to the final consumer, but leads generally to tyranny, insubordination, poor work, and poorly paid (and therefore inefficient) help. It is, indeed, the father of the sweat-shop.

By gang piece-work here is meant something entirely different. It is a plan whereby the manufacturer still pays a stipulated price for a given amount of work to a gang—the foreman generally included—but the division of the pay is made by the manufacturer himself on a basis of fairness to all concerned, each individual sharing proportionally in any increase of gang pay earned, and the manufacturer retaining to himself prerogatives of hire, discipline and discharge. The plan is not new;

but it is not practised as freely as it should be, for it has distinct advantages.

Such a method is economically valuable, especially under that condition where the work in the final result is divisible into definite units performed by a gang, but in its progress passes through the hands of individuals in such a varying and changing method as to be practically indivisible into units for individual piece-work value. The gang becomes the contracting individual; the final result, the paid for operation.

Let us take a definite example to illustrate:

In an envelope factory there works a gang of eight men including the foreman. The duties of the individuals are somewhat widely divided. Two men are cellarmen. They unload paper from the cars and wagons, take up paper on order to the envelope machines, and bale the waste cuttings as they come down the chute from the envelope cutters. Four men, including the foreman who also plans and lays out the work, cut envelopes on machines. One man cuts envelopes of odd sizes by hand, and the eighth member of the gang is a boy who delivers the cut envelopes from the cutters to the envelope machines. The envelopes are of all possible sizes and quantities, and it is easy to imagine that there was amply basis in fact for the predictions that were made that it was impossible to put this work on piece-work successfully, without more labor in working out the rates on the more than one million cut daily than the saving would be, not to mention the difficulties of planning the work so that each man got an equal share. Gang piece-work, however, solved the situation in the simplest way.

A rate of 2 cents per thousand envelopes of any size for the whole gang of eight men was arrived at by careful record and observations, covering all kinds and sizes of envelopes, and the weekly amount earned is divided between the members of the gang on a fixed

percentage basis, the foreman getting the largest and the boy the smallest proportion. The payroll of this gang is arrived at in five minutes at the end of the week; for, take note, the gang is paid each week, not on what it cuts but on the number of thousand shipped out of the factory. This method has, first, the decided advantage that only good work is paid for, and the number is beyond the question of dispute.

In this case gang piece-work has worked most excellently to the advantage both of the factory and the men. Production has increased largely, and so has the pay of the men, despite the decrease in cost.

Gang piece-work developed here its natural tendency toward cooperation, always the great force toward results. While it would have been very difficult, if not impossible, to have made individual piece-work rates for the different operations and classes of work, it would have been much more difficult, on the individual piece-work plan, to have divided the work so as to have obtained satisfaction with each man. When all were in the same boat, however, they learned quickly to pull together.

Take another example—a plating room. Here the parts of varying sizes, weights, and shapes went now into this man's hands, now to another's. The work could not be divided into separate operations and be economically finished. The day-work plan was the only method by which it appeared possible to do this work. Individual piece-work, as any plating-room foreman will acknowledge, where the operations are many and varied, seems impossible. Gang piece-work, however, solved the problem. Piece-rates for the finished article were worked out, and the gang (including the foreman) were paid weekly on the product turned out by the room, the piece-rates varying as to the different articles and the total amount being divided between the operatives on a pre-arranged percentage basis, the foreman getting the largest percentage. The result was decided economy to the plant and increased wages for the operator.

Many more examples of the value of gang piece-work where individual piece-work is impossible might be given, but there is also to be obtained from gang piece-work frequently a value where individual piece-work is easily possible. Such cases arise where the policy of "each man for himself and the devil take the hindmost" (which, we must confess, individual piece-work has some tendency to foster) is a policy that leaves the company also with the rear guard.

Here the value of the cooperative force of gang piece-work becomes very apparent.

Let us again take an example.

A force of twenty-five to thirty men assemble small parts into a finished whole. There are a great many small parts, and some of these have to be assembled and passed on for adjustment with other parts likewise partly assembled. Despite careful planning, the weekly production constantly varied and an excess of small parts was constantly demanded on the individual piece-work plan. Each man was working for himself, hoarding parts whenever possible, frequently stealing them from his neighbor, passing on partly assembled parts poorly done, demanding constant inspection, adjustment of disputes, and not a little confusion.

Gang piece-work was installed and the situation immediately changed. Production rose to a fixed maximum. Inspection was unnecessary except to test the finished article. There was a decrease in parts disappearing. The necessity of cooperation for the general good, the broadening of the scope of the individual to look to the welfare of the whole instead of his own solely, had in this work (as it has in any other affairs of the world, political, religious, humanitarian) an extremely beneficial effect for all involved.

In fact, gang piece-work seems to be especially adapted for results where numbers of small parts are involved, when these parts have to pass through many operators' hands. This same plan was put into another department

of the same plant, where certain small parts went through a number of different kinds of operations necessitating that one operative should pass them to another. On the individual piece-work basis, there was considerable delay and much necessity for special rush to get certain needed parts out of this department, despite careful routing. Unforeseen delays and occurrences, lack of interest on the part of each individual except in his own work, much loss of labor paid on work spoiled before it reached the last operation, beside a great deal of calculation necessary to make up the payroll, were discovered.

Gang piece-work miraculously stopped this. The gang, paid a single rate on good finished parts, quickly discovered ways of getting through a greater proportion of good finished parts and of reducing to a minimum the time of routing.

Cooperation—and it is a fact, comment upon it as you will, that the opportunity for gain will bring the most intelligent cooperation on the part of the average body of men when properly led—cooperation educates. It makes common to the gang the education and skill and energy of each man. It works toward greater efficiency of the whole.

To establish gang piece-work it is necessary, first—to find, as a basis for rate payment, some final result or results which a gang of men are engaged in accomplishing; second—to establish a definite method of division between them of the amount earned by the gang, this being based generally on the relative skill and position of the men involved.

While as before noted gang piece-work is not a new institution, it is one that in most plants has never been utilized to its most profitable extent. For it is useful both in attaining the highest percentage of piece-work efficiency and in introducing what most concerns stand badly in need of—cooperation. And if it be from the point of view of labor itself, since it demands equal wage

for all of a class and decries piece-work partly because of its discriminating effect, what could more justly meet its view and still satisfy the employer than gang piece-work?

From many ethical considerations, it is well for men to be bound together for a common cause when that cause is a fair one, and any possible advantage that such a combination in a manufacturing plant may get because its demands for rates and privileges may be incited by the cleverest and strongest man in the gang, may well be considered as offset by the fact that its results, the energy and skill of its workers, are likewise incited by the same force. And it is undeniable that this form of payment brings about a concerted action on the part of the gang, which while it may not replace or be as effective as a careful and intelligent plan from a superior executive source, is, nevertheless, a good abettor of such a plan and assists materially when there is no such plan.

SPECIAL APPLICATIONS OF THE PIECE-WORK SYSTEM¹

In some plants the piece-work system has been extended so that it covers almost every branch of work with the exception of that of a watchman at a fixed post. Where it is impracticable to carry out detailed time studies—such, for example, as are necessary in the Taylor system—it is often possible to accomplish a great deal, particularly in connection with those operations where piece-work is least likely to be used, since they are outside the regular manufacturing channels.

If each step in the manufacture of the product be carefully analyzed it will be found, almost without exception, that in addition to the operations which are of record and for which a piece-price may and may not be

¹ By H. F. Seward, Certified Public Accountant. *Journal of Accountancy*, 20 : 122-8. August, 1915.

established, considerable time is spent on work of which there is no record. This may constitute a large proportion of the overhead expense if it is paid for as day-work and applied as overhead by reason of its not being reported against specific jobs.

If a record be kept to which is posted a memorandum of all such operations together with the quantity produced and the time spent thereon, it will be necessary to have a daily system of time reports for each workman which will make it obligatory to account for each hour of the working day. With such a record, it would be impossible for a workman who, for example, might have completed a piece-work job at 2.30 p. m. to secure an allowance for the balance of the day as merely "day work" without specifying clearly the nature of the work, the quantity turned out, and the actual time consumed. The various time stamps on the market are a great aid to the accuracy of such a record, although the result may be approximated by use of a time ticket divided into hours and tenths. One ticket would be used for each operation, the starting, the finish and the elapsed time being entered thereon in pencil or by means of a punch.

A permanent record could be kept in which a page would be provided for each operation performed as shown by these individual time reports of day-work. As the tickets were received daily, they would be posted to this day-work register. It might seem at first thought that this would entail a great amount of clerical work, and in many instances this would be true. This extra work, however, would be more than offset by the knowledge gained, because after the record had been in use a short time it would be discovered that operations were being reported of which there was no record whatever. In addition to this, the cost per unit quantity could be extended on the register for each operation daily, and at the end of a reasonable time would furnish an excellent basis for the establishment of a piece-price.

In several plants where this register has been installed it has met with great opposition, but it has invariably demonstrated its efficiency not only from the standpoint of the knowledge gained, but from the fact that the production has actually been increased. It would appear that the reason for this is fundamentally to be found in human nature. If it be possible for a workman to do work without any systematic check upon him, especially where he is aware that the management is ignorant of the fact that the operation is being performed at all, it is the most natural thing in the world for him to do it in his own time, but where he knows that the results are being recorded, he will unconsciously increase his speed.

While no claim is made of extravagant results from the installation of this plan, it has been demonstrated in each case where it has been used that the increase in production has more than compensated for the extra cost of the clerical work. Naturally, the unit costs disclosed by this day-work register would not be minimum costs but would be an excellent foundation upon which to establish the final piece-rate. Even if no increased production resulted, however, the costs are actual and the record is invaluable for the purpose of estimating.

It will be found that the development of this plan can be carried out almost indefinitely, and in the factory itself it will be possible, in connection with strictly manufacturing work, eventually to place the entire work of the factory upon the piece-work basis. To carry this out in connection with mechanical work is comparatively simple and could, temporarily at least, be handled by competent foreman with sufficient training and intelligence to understand the principles involved.

When it is attempted, however, to carry it further and place such work as sweeping, hand trucking, and other non-mechanical work upon other than an hour-payment basis, it will be found, almost invariably, that

not only does a great deal of prejudice exist but that the average foreman is either incapable or unwilling to undertake the task, or that his mental inertia is such that he cannot overcome it sufficiently to make a start, it being a well established fact that the average foreman has in mind what he considers the interests of his men more than he has the interest of his employers, although he may be entirely unconscious of this.

It is the intention of this article to point out to small manufacturers who do not feel able to afford the services of specialists of this kind means whereby they themselves can accomplish a great deal and reduce their expenses materially.

SWEEPING

Under present fire insurance regulations and from an economic standpoint, it is imperative that factories be kept clean and that refuse of all kinds be removed from the plant at least once a day. This is ordinarily done by sweepers. It will be found in the majority of cases that these men have a more or less roving commission, their general instructions being to see that the factory is kept clean and that refuse is disposed of daily.

In a case like this the layout of the plant should be studied with a view to mapping out routes for the sweepers to follow. Ordinarily, it could be arranged to have one man on each side of a room, both sweeping in the same direction. If one finished before the other, he would assist on the other side of the room, the refuse being placed in proper receptacles either provided with running gear or placed upon a hand truck for easy transportation. Beginning at the top of the building they would proceed downward floor by floor, provision having previously been made for empty receptacles at the end of each floor where they would finish sweeping.

In this way it can be ascertained what time is necessary, in ordinary circumstances, to clean each room,

including filling the receptacles. The removal of the receptacles, if possible, should be in charge of a gang of truckers so that the sweepers' time will be devoted entirely to that work.

In one instance with which the writer is acquainted, when this plan was inaugurated the force of sweepers was cut down from sixty-five men to forty at the end of the first week, each one of the forty men earning approximately \$2.50 a day instead of \$1.75 previously earned.

TRUCKING

The same principles apply to trucking. The proposition, however, is somewhat different in detail, owing to the variety of the work, the uncertainty of the time when the service will be required, and the routes, distances, etc. A careful study of this will show, however, whether or not the work is sufficient to warrant a central dispatching station with a clerk in charge and a telephone connected with each department. In many cases arrangements can be made in the different departments to have their work ready for transportation at specified times, and in such cases routes can be laid out so that the truckers can utilize their time to the best advantage and lose very little of it in returning light. It is important, of course, to have trucks in good condition with wheels of large diameter and well oiled. The height of the truck platforms should be studied to obviate as much lifting as possible, and the dimensions of the carrying space should be made to accommodate average loads. In many cases, it will be possible to provide steady work to and from certain departments where trucks, specially designed for the efficient handling of the particular work can be utilized.

If several good men can be interested in the experiment, the routes can be laid out and tests made to demonstrate the time required for each particular route. It

will always happen, of course, that extra work will come up, making it necessary to send trucks from the dispatching station to the departments from which the call comes. It will not always be possible to provide a load going in that direction, so that an allowance must be made for this. The dispatcher should be provided with a time stamp, and the trucker's tickets should be stamped on departure and upon return. If time stamps are employed in each department, the trucker's ticket should likewise be stamped by the foreman to whom he reports. This is particularly important in case he is sent from there to another department on a special call.

This plan, worked out systematically, will result in a material saving, there being an even greater opportunity for truckers than for sweepers to waste time. In the same plant where the reduction in the sweeping force, as above mentioned, was accomplished, a reduction of the number of truckers from eighty-six to sixty-three was made. In this connection, where a great deal of trucking is done from one building to another, it is important that side walks be smooth and hard, and it has paid in several instances to put in concrete walks.

In a great many plants which cover a wide area, where freight is received on private sidings, it is desirable to have an unloading platform of the same height as the car floor, adjacent to this siding. It is sometimes customary to have freight examined by a representative of the receiving department as soon as the car seal is broken. If this examination consists entirely of a count, as it would, for example, in the case of cement bags, it can best be carried out in the storehouse to which the contents of the car would be transported, but with some merchandise, such as copper, lead, etc., it is sometimes necessary to arrange the ingots and count them prior to their removal. This piling and counting should be done by the piece as well as the unloading upon the receiving platform.

It is often possible to utilize platform trucks operated by storage batteries which can be run directly on to the receiving platform and into the car where they can be loaded and taken to the storehouse. If the number of trucks, the number of men in the car and the number of men at the storehouse be properly proportioned it will be possible to unload each car, transport the goods to the storehouse, weigh on floor scales and pile in bins with very little waste time, a uniform piece-price being established for each gang of men. If there are several cars to unload it would be an advantage to have one gang unloading and one or two other men arranging the next cars ahead so that as soon as one car is finished the gang can proceed to the next one without loss of time.

In order for this to work out satisfactory, the roads about the plant must be in first class condition, and it will be found profitable to keep them well rolled and hard. If electric platform trucks are used to any great extent, it will sometimes pay to put in concrete sidewalks. If horses are utilized, however, care should be taken when the price is established that it is not based upon overworking the horses, because this is neither humanitarian nor economical. It will sometimes be found necessary during bad weather to make a special rate for the work, but a careful study of the proposition will disclose opportunities for saving a great deal of time.

Where it is impracticable to build a receiving platform alongside a railroad siding, hand trucks can be placed upon a wagon or automobile truck and loaded from the car, one man standing on the truck and the others in the car. Upon arriving at the storehouse the truck could be backed up to a small platform of the proper height. The hand trucks could then be pushed on this platform, from which by means of a rope and a snubbing post they could be run down an incline to the ground. If the storehouse is open at both ends, these

hand trucks can be dispensed with, the goods being piled upon the floor of the wagon and the latter driven into the storehouse to the proper point for unloading.

MISCELLANEOUS WORK

Examples of work which can be handled in the same way can be multiplied indefinitely. If a plant makes a great amount of paper scrap a machine baling press can be installed, the different classes of paper being baled separately and the piece-rate being based upon the weight or the number of bales. In connection with this operation it is necessary to prepare burlap covers for the bales. These can be prepared on a sewing machine and a piece-rate established for this work. If arrangements be made with consignees to return these burlap covers, they can be used again, a piece-rate being established for overhauling them.

Another operation which can be based upon a piece-work basis is the sorting of scrap of various kinds, packing it in barrels, and coopering the barrels. It often happens that consignees return barrels, and a piece-price can be established for re-coopering. If the plant is of sufficient size to have a scrap storehouse where the scrap is kept until a carload is ready for shipment, prices should be established for placing bales in piles and for loading the cars and in fact for practically all the necessary work.

Another instance of the possibility of developing the piece-work system is in connection with kilns and lumber yards. A price could be established for unloading cars of lumber, for trucking to the pile and for piling; for taking down, transferring to the kiln and piling in the kiln; and for taking down from the pile in the kiln and transferring to the cutting-up shop. In some cases lumber is cut into small pieces as soon as the car is received, the ends being painted to prevent checking, after

which the pieces are piled in a kiln. A piece-price can be established for all this work.

The above illustrates only a few of the possibilities. In making an investigation of this character it is important to study each element of each operation, because it is often possible to change the gang of men in order to have them work together more economically, and this cannot be done without complete knowledge of the detail of the work to be accomplished.

CHAPTER IV

DAY-WORK AND WEEK-WORK

THE RESULTS OF DAY-WORK SYSTEM ¹

Day-work, or that in which men are paid for the time they spend, may be divided into two classes; first, ordinary day-work in which there is no attempt made to keep individual records, and every man of a class receives the same wages regardless of the amount of work he does; second, that in which the work is carefully planned beforehand so that each man can have continuous work, and so that an exact record can be kept of what he does, and his rate of pay adjusted accordingly.

The day-rate of any class of men, such as laborers, weavers, machinists, moulders, etc., is regulated by supply and demand, except where it is regulated by the union; and in times of extreme depression even the unions are unable to keep up the rate. The rate may be, and usually is, different in different localities. Under the condition where no individual records are kept, it does not make much difference whether one man is more efficient than another or not; it is almost impossible for him to get a higher rate of wages than the rest of them. If the pay of one is raised, others are apt to claim that they also are entitled to an increase, and in the absence of records it is impossible often to disprove their claim. To save discussion, then, and possible trouble, the employer declines to sanction any increase of pay. The industrious and efficient man naturally becomes dissatisfied and gradually slackens his pace to that of the poorer

¹ From *Work, Wages and Profits*, by H. L. Gantt. p. 65-70. Engineering Magazine Company. 1916. Reprinted by courtesy of the publishers.

workman. Thus the employer, who pays only the rate the poorer man can earn, gets only the efficiency he pays for, even from his capable man, who thus works far below his capacity.

This method of buying labor is similar to buying all materials sold under the same name at the same price, without regard to quality; but it is much more wasteful, as the difference in the quality of materials is seldom as great as the range of efficiency in workmen.

The result of this policy—and it is the logical result—is that the efficient man, the man with boundless energy to spare, says: "I can't get any more money by doing more work. I am going to see if I can get it some other way." Then he organizes all his fellows into a union, and they all say, "We want more money!" and they get it, and no man cares whether he does more work or not. The moral tone of the shop and the community is lowered, as is always the case when there is a resort to force.

In the second class of day-work some intelligent man studies the work to be done, lays it out carefully, perhaps several days ahead, provides the proper appliances, divides it up in such a manner that it can be done by individuals or by men in small gangs, so an exact record can be kept of what each individual or gang does, and compensation be made accordingly. Such a method of handling workmen has exactly the reverse effect, and their efficiency begins to increase at once. When we increase one man's wages because his record shows he deserves it, it not only does not cause trouble with the other workmen, but it acts as a stimulus to them, and we are glad to have each workman know what the others are making.

It is difficult and often impossible, especially at first, to plan all the work of a plant and to keep a record of each workman, but some planning can be done, and some records kept in almost every case; and if a few

steps in this direction are taken, the advantage of taking more will soon become evident.

If the conditions are such that we can plan out the work ahead of time, we will get a fair degree of efficiency by keeping individual records of the workmen, and raising their day-rate accordingly. As a matter of fact, a better efficiency can be obtained by this method than by the ordinary system of piece-work, where the rates are set by past records or the estimates of the foreman; and the tone of the shop is far better.

FALLACY OF THE DAY-PAY PRINCIPLE¹

The conception underlying day-pay is that a certain sum of money is arithmetically equal to a certain number of hours spent by a man—any man—at doing a certain kind of work. For example, every man digging dirt is worth \$1.50 for ten hours' labor; every man laying brick is worth \$5 for eight hours' labor. Stated this way, baldly and without qualification, the notion seems so foolish that it is hard to see how it ever became so generally adopted in practice. It would be as intelligent to base an economic system on the hypothesis that a string is always six feet long or that all horses run equally fast. Nevertheless, the conception persists, and will long continue to persist, and you will have to deal with it. It is in the moral code of many labor unions as the first and great commandment. The reason, as already suggested, is that the unions have found it necessary to resort to collective bargaining and to demand a universal wage-rate, chiefly because there has been in general no method practiced by employers for fair and honest individual bargaining with each man according to his ability. The result of the whole thing is a struggle

¹ From *Principles of Industrial Engineering*, by Charles B. Going, p. 118-20. McGraw-Hill Book Company. New York. Reprinted by permission of the publishers.

between opposing forces, the employer trying to push the day-wage down because he has no satisfactory assurance of anything but minimum efficiency on the part of his workmen, and therefore he wants to pay the minimum price; and the men trying to force the rate up because they cannot get it up in any way except by force.

This sort of struggle is constantly going on, with variable results. Where labor is abundant or poorly organized, and where the employer or sub-bosses have a genius for driving, probably as highly efficient results are secured under the day-wage plan as under any other; that is, the employer gets as high a product for the dollar he expends as he can get by any method. Where labor is powerful and well organized and much in demand, the results secured under the day-wage system are perhaps as inefficient, as little return is obtained for each dollar expended, as in any application of capital to productive or constructive work, except, perhaps, in deliberately dishonest political jobs.

Nevertheless, the day-wage remains today the method of payment for a very large proportion, perhaps a large majority, of all service. I have dwelt strongly upon its unfavorable features, but, of course, they are to a certain extent, even if imperfectly, remedied in practice. The extremely good man cannot be held down, and he will break through even the dead level of day-pay; so the fallacy of assuming that all men are equally worth \$1.50 a day is corrected fractionally by picking out here and there a peculiarly able man and making him a job boss or a sub-foreman at \$2 or \$2.50, while the hopelessly incapable fellow is fired off the job and gets no wages at all. The plan as a whole is one of those rough and ready ones that the world has always used and always will use. And it does express, although it expresses it badly, a certain vital truth; that is, that time, after all, is the one supreme value that must be seized and used moment by moment or it is lost forever. If

machinery is idle the opportunity may usefully be taken to overhaul and repair it; if material is idle it may be worked over into something else which is active; if dollars are idle they are only dormant and will come to life and into circulation as soon as there is an opportunity. But if hours are idle they are dead and gone forever. This truth of the fundamental value of time is recognized by the day-pay system. You will find the system in use everywhere and you will have to get along with it; nevertheless, in most cases a much more intelligent plan for hiring time than the day-wages plan can be devised and may be applicable.

OBJECTIONS TO TIME-WORK¹

It is obvious that of all methods the furthest removed from the ideal is that of time-wages at a uniform rate. It presupposes an equality which has no existence, and it is therefore based on a false principle. The more skilled the work the more false the principle. That becomes clear if the most highly skilled occupations, which are those requiring the greatest mental effort or the rarest natural gifts, are considered. In these the reward transcends pecuniary remuneration altogether and cannot be measured at all; it is purely personal. When power and fame, the approbation, the confidence or the love of one's fellows, the satisfaction of conscience and the sense of duty are among the earnings, the very idea of equality is out of the question; it becomes unthinkable. The individual diversity thus plainly revealed in the higher occupations and their rewards extend in some measure throughout the scale, but becomes less as we descend into the regions of manual labor until we reach the lowest strata of unskilled work. Here there

¹ From Arthur Shadwell's *Industrial Efficiency*, p. 390. Longmans, Green & Company. New York. 1913. Reprinted by permission of the publishers.

is least room for variation in the value of services rendered, and therefore least waste of potential energy through failure to elicit it by varying incentives. In the most unskilled labor the value to the community of one man who can do the work at all is most nearly the same as that of another, and a uniform scale of payment by time is therefore least uneconomical. In proportion to the departure from that standard it becomes more and more uneconomical. To condemn any men to it who might be subject to another system is to mark them with the brand of inefficiency. The minimum time-wage is itself a sort of tacit and unconscious protest against a uniform rate, for a minimum implies possible variations which are not to sink below but may rise above. In short, time-work should be avoided whenever possible, unless it be adjusted to individual capacity

PART II

CHAPTER V

PRINCIPLES, METHODS AND RESULTS OF BONUS SYSTEMS

REPORT OF COMMITTEE ON BONUS SYSTEMS IN ELECTRIC LIGHT INDUSTRY

A committee appointed by the National Electric Light Association in May, 1920 investigated the bonus systems used in one hundred and forty large central station companies and supplemented this study by an investigation of twenty of the largest industrial concerns of the country. The following digest of the committee's report offers a good summary of the principles underlying incentive plans.—Editor.

An extract from the discussion of the Accounting Section at the 1919 Convention of the National Electric Light Association summarizes the circumstances under which the Bonus Systems Committee was formed:

In our profession and with our clerks, it is inevitable that a man, after he has served a number of years and attained a certain efficiency, reaches the maximum rate of pay. When a man has reached that point he has gotten about as far along as he can get. I think that is true of the great bulk of our people. He has reached the point where he is receiving all the pay there is in a certain occupation, he does not see much ahead of him and he is apt to lay back on his oars and perform just about as much work as is necessary to hold his job. The question arises if there is not some incentive we can put in front of that man to keep him on his toes more or less all the time, so that when he does a good piece of work, he will be benefited by it and see the benefit in the form of cash. It may be that the bonus system is the solution of this kind of trouble.

DEFINITIONS

NEED FOR EXACT DEFINITIONS

The preliminary researches and discussions of the committee brought out the fact that very little had been

published to develop and define the theory of bonus systems, and that there were innumerable other methods of wage payment that resembled bonus systems and were often loosely referred to as such. Before a study of bonus systems could be made it was necessary to define exactly the term "bonus system" and to eliminate definitely other methods of wage payment from the consideration of the committee.

The various methods of wage payment may be grouped between their two extremes, which are the old-fashioned straight hourly-wage and its direct opposite, piece-work. Between these two methods lies the so-called "incentive-wage" group, of which the bonus system is one.

DEFINITION OF BONUS SYSTEM

A bonus system of wage payment is a plan for stimulating workers to interested effort, and for sharing with them extra results of their industry. It presupposes the employment of the worker at the regular hourly- or weekly-wage, that is, the going market price for his grade of labor. In return for the regular wage the worker is required to accomplish a standard normal quantity of work of passable quality. For the accomplishment of work in excess of standard requirements the employer pays to the worker a bonus above the market price for his labor. The extra accomplishment above normal which earns the bonus may be attained in any one or more of a number of directions; for example, the increase of the quantity of work produced, the improvement of its quality, the lessening of labor turnover, the elimination of errors, the reduction of operating costs, or the economical use of materials, such as coal. These accomplishments are the direct or primary objects for which the employer offers the bonus to the worker.

SECONDARY OBJECTS

There are also a great many less direct or secondary objects to be attained by the establishment of bonus systems. Among these may be mentioned greater satisfaction among the employees, the same production with less effort, i.e., more efficient work, the stabilization of an organization, the encouragement of initiative for the purpose of developing executives, the elimination of unrest, the elimination of the evil results from certain tendencies of labor unions, and the development of more accurate methods of rewarding employees directly for the results of their work, for the broad human reason that men should be treated as human beings instead of as machines, as well as many others which it is difficult to enumerate.

UNDERSTANDING AND SYMPATHY NEEDED

To accomplish successfully and continuously the objects in mind requires from the employer a knowledge of the best methods of performing various operations and duties, and proper instruction and training so that the employee may reach the required proficiency; a continuous study of and search for improved methods; the maintenance of favorable working conditions and, in general, a sincere sympathy with and clear appreciation of the employee's needs and desires.

There is required from the employee, within the limits of his ability, individual efficiency, initiative, creative ability and a satisfactory character of work, and particularly an understanding of the employer's interests and a desire to cooperate in the accomplishment of the work in hand.

Without this sincere sympathy on the part of the employer and a spirit of cooperation on the part of the employee, it is doubtful if any system of payments or rewards by itself can produce permanently satisfactory results.

PLANS NOT CONSIDERED

Having accepted the definition of the term "bonus system" as given above, the committee has excluded from its consideration a great number of plans which resemble bonus systems and which are often loosely referred to as bonus plans. It is certain that there is a great deal of merit in a number of these unconsidered plans and the committee wishes to suggest that a detailed study of them by succeeding committees would be of great value to the association. They are excluded here because they are not true bonus plans and do not come under the scope of a committee appointed to study bonus systems.

The plans which the committee has excluded from its consideration are profit-sharing, piece-work, commissions (usually to salesmen), prizes, safety awards, sale of stock to employees on advantageous terms, commissions on sales of the company's stock, cost-of-living bonuses, group life insurance and employees' savings plans.

Profit-sharing in particular has enjoyed wide popularity of late in the endeavor to give workers a larger share in the results of their labor. At times certain features of profit-sharing plans cause them to resemble very closely bonus plans and the distinction between them is difficult to make.

Commissions to salesmen and others bear a close resemblance to bonus plans, but the committee has not studied them because they are not true bonus plans. The scheme of boosting sales by giving commissions to the salesmen is very much older than the modern bonus plan and is pretty generally understood and accepted by both employers and workers.

Cost-of-living bonuses, so-called, are in reality not bonus plans but expedients to adjust wage scales to fit cost-of-living conditions which are considered to be of a temporary character. They are called bonuses, but the difference between them and a true bonus plan is so obvious as to require no explanation.

SUMMARY

Having defined a bonus as an extra wage beyond the going market price for labor in return for effort or excellence on the part of the worker in excess of that considered normal, and having drawn the line clearly between true bonus plans and the multitude of plans loosely referred to as such, the committee can now give the results of its investigations of the status of bonus plans in the central station industry.

RECENT ORIGIN OF BONUS PLANS

It is noteworthy that a great many of the bonus plans are of comparatively recent origin, a large part of them having been instituted during the war period. The newness of the plans described, together with the small percentage of the employees affected and the widely differing opinions as to their value, definitely place the bonus system, at least for central station companies, on a trial or experimental basis. Its final success or failure has not yet been proven.

TYPES OF BONUS PLANS IN USE

ECONOMY BONUSES

Economy bonuses are designed to promote economy in the use of material, for our industry this material being almost exclusively coal. This type of bonus is particularly adapted to generating station employees and has been tried out in nine such stations and discarded in three of them. Changes in generating equipment and in the quality of coal used compel dislocating adjustments which are often so serious as to cause the discontinuance of the plan. It has been the least successful of the five types.

CONTINUITY BONUSES

Continuity bonuses are paid to employees as reward for uninterrupted terms of service and are designed to

reduce labor turnover. This type of bonus was especially popular during periods of labor scarcity due to the war. It may be paid to hourly men for not laying off at awkward times or to employees who attain two, three or four years of continuous service. It is usually offered indiscriminately to all employees, but may be used to relieve a particularly hard pressed department. In the latter case its useful life is apt to be short. This type of bonus was reported by thirteen companies of which three had discarded it.

QUALITY BONUSES

Quality bonuses are paid to workers who do work of a grade consistently higher than normal. The standards set are various and the object to be attained may be accuracy, neatness in personal appearance, punctuality to schedule, thoroughness or any one of a number of others which will suggest themselves. Such bonuses usually take the form of the payment of a lump sum, from which deductions are made for various failures to attain the standards set, and they tend to slow up the workers and make them more careful, rather than to increase their production. This type of bonus was reported by eight companies and has not been discarded by any of them.

QUANTITY BONUSES

Quantity bonuses are used to stimulate interest and activity on dreary routine jobs in order to increase production. They involve the counting and rating of individual output and must be accompanied by a check to prevent unsatisfactory work. This check may take the form of inspection before acceptance or of deductions and penalties for a poor grade of work or frequent errors. Repetitive operations covering a great volume of similar work, such as meter reading or customers' billing, lend themselves to this type of bonus plan. It has been reported by thirteen companies and discarded by two, one because of trouble with a labor union and the other because of faults in the plan. It is used chiefly in meter

reading, customers' billing, meter cut-off work, bill delivery and meter testing work.

COST BONUSES

Cost bonuses are defined as that type of bonus plan which involves the setting of a standard cost for the completion of an operation or of a series of operations. If the time required by the workers to accomplish the operation multiplied by their rate of pay gives a product less than the standard cost, there is a saving, which may be divided between the workers and the company. Instead of setting a standard cost, the time in which the work should normally be completed is sometimes standardized, so that changes in the basic wages will not compel a change in the standard. This is the most difficult type of bonus plan to set up, and was reported by only three companies. It involves time studies or very careful record work and adjustments have to be made for changed working conditions or variations in the general market price for labor. Its direct object is the reduction of operating expense through the more efficient execution of the assigned tasks. The two companies mentioned above have used cost bonuses to a large extent, applying them to a great many different classes of work.

TO GROUPS OR TO INDIVIDUALS

Any of the above five types of bonus wage may be applied either to individuals or to small groups of workers and this fact does not constitute a change in the type of bonus. If bonus is paid to individuals, it develops competition and rewards personal effort; if paid to small groups of workers, it promotes cooperation and tends to make slow or inefficient individual workers very unpopular with the rest of their group. Bonuses earned by a group of workers may be prorated to the constituent individuals on a point system, or in proportion to their base wages.

COMPLEX OR RUDIMENTARY FORMS

Two or even more of the five different types of bonus plans may appear on the same bonus schedule. Thus a quantity bonus tempered by deductions or penalties for poor quality might be said to be a quantity-quality combination. At times a continuity feature is injected by a condition that only employees of three months' standing may earn bonus, or that employees leaving in the middle of a month forfeit their share of the bonus for the month.

Rudimentary or undeveloped forms of bonus wages are very common. Practically all companies pay the best wages to those employees who secure best results in quantity or quality. Other companies make it a practice to raise the wages of an employee after a probationary period during which he has "made good." This is a very low type of continuity bonus. Such systems of wage payment are not recognized as bonus plans, unless the conditions of the increases in pay are published to the employees.

ESTABLISHMENT OF A BONUS SYSTEM

STUDY OBJECTS TO BE ATTAINED

The first thing requiring attention in the preliminary work preceding the establishment of a bonus plan is the study and analysis of the objects to be attained. If turnover is so excessive as to render the organization unstable and inexperienced, an incentive-wage to make the men stick to their jobs, i.e., a continuity bonus, may help the situation. If workers have lost hope and are plugging drearily along at a routine task, a reward for greater production will stimulate interest and enable them to increase their earnings. If errors are frequent and costly and the company's reputation for accuracy is suffering, the quality bonus may improve the grade of work. A number of direct objects may be combined, with stress on the more important ones, in a single bonus schedule.

SECONDARY EFFECTS

Not less important than the immediate end to be attained, is the study of the after-effects of the introduction of bonus plan. These are sometimes very difficult to anticipate. Labor unions may develop unexpected antipathy to the plan, the desire to earn bonus may breed dishonesty and deceit in the workers, employees may grow to regard the bonus as a part of their just wages and demand it whether they earn it or not.

STUDY WORKING CONDITIONS

To determine what constitutes a normal condition of affairs before adopting a bonus plan it is necessary to examine records, make time studies and study working conditions. A number of reporting companies have emphasized the fact that this preliminary study has led to changes in office procedure, desk arrangement, printing of forms, etc., that have been of very great value. Records of conditions before the inauguration of the bonus plan should be obtained for comparison with records made after the plan has gone into effect. If this is not done it is difficult to tell whether the bonus scheme costs more than it is worth or not.

ESTABLISHMENT OF SYSTEM

The actual establishment of the bonus system involves the setting up of the necessary office apparatus to keep a separate record of the performance of each worker or of each group of workers in case the bonus is paid to groups. If the bonus schedule is complicated, the work of keeping these records may be very great, and the subsequent work of computing the size of the bonus checks will be a considerable item of expense. The bonus system should be as simple as is consistent with the direct objects to be attained. Each worker should be encouraged to figure his own bonus in order to increase his interest and to establish his confidence in the regular computing clerks. The setting of standards of

performance where these are based on statistics, and the routine computation of bonuses, should be handled by a detached department to prevent any chance of prejudice or unfairness. The work of this separate department may be extended to provide the executive with cost reports and to study and give advice to other departments in which the possible introduction of the plan is being considered. After the plan has been in use for a time, there are bound to appear certain discrepancies and crudities that can very well be adjusted by this department. If the number of workers under the bonus plan is small, this department dwindles down to one man, and the work may, indeed, take only a part of his time. In this case he should be sufficiently detached to maintain an unbiased and impersonal viewpoint.

FAVORABLE CONDITIONS

Bonus systems, especially those of the quantity and cost types are most easily established in those departments where there is a great volume of repetitive operations, such as occur in meter reading and in customers' billing. Such work lends itself most readily to the setting of standards and the keeping of the necessary records of the individual workers. The work is also apt to be naturally dreary and monotonous and it seems to require an incentive-wage to secure its economical accomplishment. In work of a varied character, it is necessary to rate the different parts of the work on an arbitrary system of points which may be added up to determine worker's total score, and this introduces an additional complication. Bonus plans should be kept as simple as possible.

NOTES ON THE THEORY OF BONUS SYSTEMS

AVOID INCREASING REQUIREMENTS

The experience of reporting companies has emphasized certain general considerations that should be

kept in mind to avoid undesirable secondary effects. Employees must be convinced that after a bonus schedule has once been definitely established embodying the standard requirements to earn the base-wage, these requirements will not be raised in order to get more out of the workers for the same money. This is absolutely necessary to avoid the stigma which has become associated with piece-work and which has brought the latter form of wage payment into such disrepute with organized labor. Necessary adjustments to care for changed working conditions should be made with the greatest care and should rather favor the employees than otherwise.

RELATION OF BONUS TO BASE WAGE

The bonus should be of a respectable size as compared to the base wage; large enough to furnish an adequate reward for the increased effort. A reasonable proportion seems to exist when the bonus that may be readily earned by a worker of average capacity is about 10 per cent of the base wage. It may be larger than this with advantage, but if it is much smaller, it begins to assume the aspects of pin-money.

DIVISION OF SAVINGS

The amount of the direct saving under a bonus plan is the difference between the standard requirements and the actual accomplishment of the workers. In quantity, economy and cost bonus plans the direct saving is usually easy to compute in dollars; in continuity and quality plans, it is not ordinarily possible to make this computation and the saving must be estimated. Current practice differs as to the sharing of the amount of money saved between the employer and the worker. In the case of the two large companies mentioned before, 40 per cent of the direct saving goes to the employee, 40 per cent to the company, and the remaining 20 per cent is used to defray the expenses of operating the bonus plan. Another large company making extensive use of the cost

bonus plan awards the entire direct saving to the employee and is content with the saving on overhead as its share.

MAINTAIN IDENTITY OF BONUS

The bonus is an extra reward for unusual effort and it is well to maintain its identity as such, lest the employees grow to regard it as a part of their regular wage and demand it whether they earn it or not. Identity may be maintained by allowing the amount of the bonus to fluctuate quite widely and by making the bonus payment on a check separate from the one used to pay the base wage and possibly issued at a different time.

EQUAL OPPORTUNITY

It is essential that all workers coming under the same bonus schedule have equal opportunities of earning bonus. The one company which discarded a quantity bonus plan for meter readers reports that a post-mortem of the methods of assigning work revealed the fact that the maximum possible bonus which individual readers might attain on their assignments actually varied from 26 cents to \$3.50 per day. In this case the workers ceased to rely on their own efforts and began praying the god of chance for a fat assignment, thereby defeating the direct object of the scheme.

TRAINING AND ENCOURAGEMENT

The study of the reasons why certain workers persistently fail to earn bonus will sometimes reveal serious faults in the schedule. One company which has adopted the bonus plan very extensively for a large office force pays particular attention to those workers who seem unable to earn the bonus, giving them special advice and encouragement and offering special prizes for even slight improvement. If the worker is still unsuccessful he is transferred to another branch of the work to which he seems better adapted.

CONCLUSION

DISADVANTAGES OF BONUS SYSTEMS

The disadvantages of bonus systems arise mostly from the practical difficulties of making them work. It is very difficult to establish fair standards of performance, especially for work which does not lend itself to such treatment, such as goes on in an ordinary accounting department. Theorists are apt to evolve intricate combinations appalling in their mass of detail. Loosely drawn or carelessly administered bonus schedules will give rise to unfairness and dissatisfaction. Employees are tempted to devise plans for beating the game and thus taking unfair advantage of a plan which was intended to increase their opportunities for earning. The interest which was very strong at first tends to peter out as the bonus plan becomes an old story. Employees come to regard the bonus as a part of their salary and to grumble if they fail to earn it. Employers are apt to seize on bonus plans as a pretext for reducing costs and crowding their men. Labor unions are apt to regard bonus plans as expedients to do them out of their just deserts and to demand forthwith an old-fashioned, honest, hourly-wage that they can understand.

ADVANTAGES OF BONUS SYSTEMS

There is one advantage of a bonus system that seems to exist whether the system works or not. The study of conditions which is a necessary preliminary often results in changes which greatly increase the efficiency of the department in question.

If the system works out successfully, there are evident all of the advantages of the incentive-wage. The workers take a personal interest in their work and are continually devising short-cuts and new methods. Idlers are eliminated and the atmosphere of the department becomes one of interested effort. Employees are enabled

to increase their earnings and this makes them more contented.

A bonus system of wage payment has a great many theoretical advantages, but there are very serious practical difficulties in the work of applying the theory to actual conditions.

BONUS SYSTEMS, THEIR ADVANTAGES AND DISADVANTAGES ¹

A bonus system for employees is a system whereby employees may receive additional earnings besides their regular salaries. This extra earning is given for additional service above a given stated service. A bonus system is based on the fundamental law that every man shall receive a reward according to his labors. The ideal bonus system is that system which serves the employees best and at the same time advances the best interests of the company.

The purpose of a bonus system is to create an interest in the individual employee for producing better results for the company he is serving. It should create a good will between the employees and the employer. It should also promote cooperation and loyalty between the employees and between the employees and the employer. It should stimulate the salesman to sell more goods, the office crew to be more accurate, and the operator to become more efficient.

It is a conceded fact in the commercial world that a reward for interest and efficient work will always produce a paying return. A good-will between an employee and the employer is one of the best assets a company can have; and this good-will of the employee can always be secured by a good-will toward him and a reasonable salary or bonus for interest and service given.

¹ By W. A. Darter. *Power Plant Engineering*. 25 : 283-4. March 1, 1921.

In all companies, there are always some men who are more efficient than others doing the same class of work. To keep these men on the same salary without giving them an opportunity for earning extra pay will cause them gradually to set their pace to conform with the average man. The correct bonus system will develop this individual interest and pay in the end much more than its cost.

A bonus system created on wrong principles may do harm as well as good. Its results must not be rivalry between the men to the extent that they do not pull together. Rivalry among the employees will sometimes lead to trickery and plotting that will tend to cause the other fellow to lose out. A bonus system must not have the tendency to cause the employees to keep secret from other employees any efficient method of doing their work. This will naturally keep down the possible average efficiency.

To get the best results from a bonus system, it must be based upon correct principles. The best basis for a bonus system is to pay a minimum salary or wage, the amount of which is based upon what the average man can do, or be hired for. Then all over this that a man can earn becomes a bonus. The ideal salary or wage is the salary or wage that will exactly cover the service given by each individual.

There are two ways of paying an employee. One way is to pay him for so much time given in service; the other way is to pay him for doing so much work. The employee who is being paid for time in service could receive a bonus only on extra time put in, or on better than average efficiency. The employee who is paid for doing so much work can receive a bonus on more than average work done, or results achieved.

There are several forms of bonus systems; each condition will call for a different system.

One of the simplest bonus systems is the giving to

each employee at the end of a period of six months or a year, a certain part or a whole month's pay. With this system, sometimes the number of years of service given by the employee is taken into consideration.

This is practically the same as a straight wage system, except that the value of one month's pay is held back from the employee until this period of time has passed. It is generally given in order to hold the employees in service so that the labor turnover expense will be less. As a whole, it serves the company very little; except at the time the bonus is given, the men show little extra interest in their work. This system does not bring out the individual interest and fails to give the company the returns it should receive for this outlay of money. It is reasonable to believe that if this bonus were distributed throughout the year to the employee the extra pay would employ a better class of workmen and as a whole the net gain would be a great deal more.

Another simple bonus system is offering a reward to an individual or group of men for doing more work or doing it more efficiently than another individual or group of men.

This system will usually produce rivalry between these men, and will under certain conditions produce good results; it will also cause the men to plot against each other to cause each other's downfall. It will also sometimes result in enmity between the men and the foundation for cooperation is lost. Also, after the best side has been shown, and they always capture the prize, then the weaker side loses interest and the reward ceases to bring results. As an example, in a certain power plant a reward was offered to the engineering shift that showed the least average B.t.u of heat per kilowatt-hour during a month's run with all operating conditions the same. It developed that when one side realized that they were falling behind the other side, they created a bypath for the fuel oil around the oil meter. As a result,

the losing side became more careless because they did not have to try to make a good showing. Enmity was bred between the two shifts and cooperation was lost.

One of the best systems and the system most used is the profit-sharing system, which gives every employee a certain per cent of the profits of the company, based on his salary.

Generally these earnings are distributed once a year; and to some extent, as a result, the interest among the employees will not be the same throughout the year. Yet this bonus, when all parts of the company are taking an interest, will have the tendency to keep the men interested, and promote loyalty and good-will between the employees and the company. It also happens sometimes, when one department of the company is losing money, that another department of the company will lose interest, even though this part of the company is in a position to make excess profits. Hence, as a whole, the net profits of the company will be less. Also, in profit-sharing there is generally no loss-sharing, and the company loses during a bad year. If the employee is made to stand part of the loss, then the average employee will fail to see the justice of it and become offended.

Similar to the profit-sharing system is a system where each department of the company receives a bonus on extra service above a given minimum service. This system if carried out on the right basis is also a good one. If the bonus is paid at short intervals, it will stimulate the average employee to do better work and more of it.

The best results are obtained when the average salary is not too high, and where the minimum service is not made too high. If the average salary is high and the minimum mark is set high, then the average employee knows he has little chance to reach the point where he will receive extra gain, hence he loses interest and does not exert himself more than is necessary to keep his place in line.

There is a tendency among some employees to slight their work in order to gain a definite point. As an example, a bonus was offered to each meter reader for additional meter readings above a given minimum. As a result the meter readers contested for the thickest settled district and in some cases caused friction between them. It also caused the reader to skip some meters that were hard to reach, and necessarily called for extra time in reading them later. It also caused them to read others inaccurately, due to their haste, and this in return caused the office more work in rereading these meters and settling disputes, and as a final result it cost the company more to straighten out errors than it saved in decreasing meter readers.

A very simple but result-getting bonus system is to pay a certain bonus to each individual for each good suggestion that is turned into the company and used. This method puts every employee to thinking and studying the conditions under which he is working. This system does not call for cooperation among the employees or between the employees and the employer, yet it promotes interest and good-will among all.

When an employee makes a suggestion and that suggestion proves to be a good one and is put into operation, the employee will feel more forcibly that he has a part in the operation of the company. This will create more interest and loyalty in the employee, and will make him more efficient.

Any bonus system that will cause the average employee to exert his best efforts for the company's good, and that will develop the individual and promote loyalty and cooperation, without too much cost to the company, will pay good dividends.

CHAPTER VI

BONUSES FOR INCREASED PRODUCTION

Bonus plans for increased production are offered in various forms ranging from the type which means a gift at the end of the year, if business has been good, to the type which lays down certain standards of production and compensates the worker for additional output.

All financial incentives are more or less closely bound up with the matter of production, and are intended to serve as a stimulus to the worker.

This brief summary will take up some of the simpler plans that distinctly provide extra payment for extra production.

A very simple production incentive is seen in the practice of concerns like the Standard Kid Manufacturing Company of Wilmington, Delaware, which gives employees a Christmas gift "according to the success of the business during the year."

The incentive in such a scheme is directed toward the entire personnel of the concern. The usual procedure, however, is to apply incentives to individuals. In some cases an entire department is used as the unit of measurement of results and the bonus is distributed among the members of the department either prorata or according to the position held by the individual. Some employers claim this plan to be more effective than the individual bonus plan as it not only urges the employee to produce more, but interests him in seeing that his fellow employees keep on the job: he then thinks in terms of the whole plant's success.

GROUP BONUSES

How a group production bonus operates is shown by the following statement of the head of the Stanley Insulating Company who says:

We have studied our production costs over a long period and have found what approximates the minimum time in which one unit of our production can be manufactured. (The following figures are only for the purpose of illustration.) In our eighty thousand hours of productive labor per month we will produce twenty thousand bottles. This means four hours of labor per bottle produced. We have announced to the plant that this figure can be lowered, but that it will require steady and consistent work on the part of every man engaged in a productive capacity.

If, over the period of a month, the number of hours per bottle is reduced 10 per cent each man in the plant will receive a bonus of 5 per cent on his pay for that month. The same for any other reduction, for example: for a 2 per cent saving there will be a 1 per cent bonus; for a 4 per cent saving there will be a 2 per cent bonus and so on. In other words, we split the labor saving on a fifty-fifty basis with the men.

In one department in which six men were working these men got together with the foreman and decided that five men could do the work and voluntarily asked the management to cut down the force by one man. He, of course, was transferred to another department. Another case, a group of four men thought that one department was not carrying its fair share of the burden and that this particular department had one man more than it should have had. They went to the foreman and asked him to cut out a man. He refused to cooperate, and the men in the plant made it so unpleasant for him that he resigned and a new man was appointed. He immediately made the saving demanded by the men themselves.

On a recent trip to the factory I noticed that a trucker who ordinarily carries two trays of bottles on his truck is now carrying three. Apparently the plan is absolutely satisfactory to the men themselves.

A GROUP BONUS PLAN ¹

A factory producing motor cars, and manufacturing most of its parts, may have in the neighborhood of three

¹ By E. K. Wennerlund, General Motors Corporation, Detroit. 100%. p. 88-96. May, 1921. This article describes the plan used in the six plants of the company.

thousand distinct parts in process in various departments. Each of these parts requires from one to twenty-five operations in its manufacture and assembly.

Thus, an automobile factory may have from fifteen thousand to twenty thousand distinct operations which have to be recorded and paid for under the individual incentive plan. We have had as high as fifty thousand job tickets as a daily average in one factory organization.

The issuance of these job tickets, with the consequent individual quantity check on production, entails an immense amount of clerical detail. In addition there is the necessity for extending the amount on each ticket and making credit entries to individuals.

Many plants, of course do not have this large volume of parts and operations in the aggregate; but taking department by department the relative amount of clerical detail involved is apt to be burdensome and expensive.

For the purpose of eliminating so far as practicable all unnecessary clerical detail, the General Motors Corporation has introduced gradually into a number of its plants the group bonus plan of wage incentive. This method has been developed and extended during the past three years, until at the present time it has become standard practice in sixteen of its factories.

The saving in overhead and the result in increased output have been found so satisfactory that managers in charge of these plants have become much in favor of the continued extension of this system of wage incentive.

The objects to be attained by organizing the factory, so far as practicable, on the group bonus plan are as follows:

1. Simplify the factory clerical system.
2. Eliminate lost time to workers, incident to obtaining job tickets and checking elapsed time on operations.

3. Obtain an accurate check on quantities completed, as the basis for payment for each group operation.

4. Simplify the time and cost system.

Under this plan the workers are organized into small groups. All operations on a part, performed by a group, are combined into one group operation. A series of groups working on a line of product becomes a "division." A standard time is set for each group operation, but the quantity check is taken from the end of the division; or it may be taken from the end of the finished assembly line.

A group is credited with the standard hours value of the product; viz: the group standard time multiplied by the quantity completed by the division. It is debited with the elapsed actual hours of the workers assigned to the group. The ratio of the group standard hours to the actual hours, cumulatively for a pay period, constitutes the group efficiency.

A bonus is offered each worker as a percentage on his pay period wages earned while assigned to the group. The percentage of bonus earned is dependent on the group average efficiency, and is obtained from a bonus table.

The greater the quantity of product from a division, the greater becomes the standard hours group credit; and the fewer the elapsed hours worked in the group to obtain this product, the higher becomes the group efficiency.

SIMPLE ACCOUNTING RECORDS

No checking of elapsed time on operations is necessary, regardless of how many different parts go through a division. Only two main statements of information are required for group accounting and costs.

(a) Credits. The quantity of each part completed by the division, multiplied by the group standard time.

(b) Debits. The clock number and daily elapsed hours of each worker in the group.

An individual may be assigned consecutively to several groups during a pay period, and he may earn a bonus in each. His bonus will be based on the average efficiency of each group and the number of hours worked in each.

The advantages shown after a considerable period of experience, wherever the plan has been properly installed are found to be:

1. No job tickets are necessary on group operations.

2. Counting or checking material in lots between operations is eliminated.

3. Employees need not leave their work, or collect coupons, to obtain credit for quantities completed.

4. A spirit of team-work is developed in each group, thus materially reducing the labor turnover.

5. Inefficient workers are eliminated.

6. Workers may do any operation within a group without transfers or job tickets.

7. A greater volume of production per man hour is obtained than under the individual system.

8. With the bonus plan there is no cause for controversy as to the division of earnings among the members of the group.

9. Accurate costs are obtained with a minimum of clerical effort.

The group bonus plan lends itself primarily to repetitive work, either on the same part or on parts having similar operations; viz: where lines of machinery are arranged to manufacture definite products repeatedly. Most modern factories have a large percentage of their work organized on a repetitive basis. It can also be introduced successfully to include small groups having miscellaneous operations on a large variety of product,

provided such parts can be regularly routed to definite groups.

COMMUNITY OF INTEREST ESSENTIAL

It is not considered that the group plan, as here outlined, is adaptable to miscellaneous jobbing or contract work, or to tool work; nor, is it calculated that it should be introduced generally to combine operations where each job is self contained, such as molding or forge work. There must be a community of interest in the output between members of the same group.

Although the group plan is essentially designed for progressive manufacturing, it is being applied with marked success to other classes of work where the group interest in production can be maintained; as for example, rough grinding of miscellaneous material, heat-treat departments, stock room attendants, loading or unloading material.

ORGANIZATION OF GROUPS

The methods recommended for organizing the shop on the group bonus plan embrace the following steps which are explained in some detail under their respective headings:

1. Divide the department into divisions, each division having one or more definite lines of product.
2. Organize divisions, into groups. Each group, whenever practicable, should consist, of five or six employees, or less. Where it is found impracticable to handle small groups on account of transfer of workers, two or more groups may be combined.
3. Appoint a group leader for each group.
4. Make a shop routing for each part, or assembly, going through a division. All minor operations performed by a group on a given part are merged into one standard operation on the routing sheet.
5. Time study each minor operation done by a

group. The sum of these minor operation standard times, plus extraordinary allowance, if any, becomes the standard time for the group operation, and is used as a basis for the measurement of efficiency and the payment of bonus. The standard time of the group operation must be on a man-hour basis to permit of a varied number of employees being assigned to the group without change in the standard time unit.

6. Arrange to give each group credit in standard man-hours for all work passing through its division and accepted by the inspector. This is computed by multiplying the group standard time by the number of pieces. The counting point may be at the end of the division, or at the end of the assembly line, depending on shop conditions. It is evident that the standard time for one group has no relation to that of any other group in the division; but that all groups in a division receive credit for the same quantity of finished product.

7. Each group must be charged with the actual man-hours, elapsed time, expended in the group. The ratio of the standard hours credited to the actual hours worked measures the efficiency of the group.

8. Compute bonus by referring to the table. Each individual in a group will be entitled to bonus dependent on the group average efficiency for the pay period, and in proportion to the number of actual hours worked in the group; viz: the individual's bonus is computed on his wages earned while assigned to the group.

9. Obtain group operation cost as follows: If only one part produced, divide the group wages, including bonus, by the number of pieces credited. If two or more parts, divide the group wages by the total standard hours credited, in order to obtain the cost per standard hour. Then multiply by standard hours for each part.

The cost will be found to be constant (at given base rates) for 100 per cent efficiency or above; and practically constant down to 90 per cent efficiency.

PRINCIPLES OF THE GROUP PLAN

The following main principles of operation are associated with this plan:

1. Job tickets or production boards are not required for group work.

2. All work flowing through a division must be entirely covered with standard time for each group.

3. A group cannot be both on standard time and day-work, because there are no job tickets for group work.

4. If an individual is assigned to do work foreign to the group, he must be transferred out of the group to the individual system; and he must obtain a job ticket in order that his time can be distributed and costs computed.

5. All bonus earned by a group is directly absorbed in the cost of operation of the group by being included in the total wages paid.

BONUSES BASED ON SUCCESS OF THE
BUSINESS

Where neither the production of the individual nor of the plant can be measured, and the success of the business as a whole determines the bonus, the plan generally provides a bonus of an additional percentage of an employee's salary, varying with the success of the establishment.

The New York National Irving Bank, before its merger, paid employees additional compensation of 25 per cent of actual salaries paid during the year, but few concerns guarantee the percentage of the bonus. In a large western bank, a monthly bonus of 10 per cent is guaranteed, but this is considered a minimum, and additional bonuses, varying in amount, are paid at different times during the year. In 1921, the average bonus paid totalled 25 per cent.

Where the bonus payments depend upon the success of the business as a whole, the practise is to declare the bonus annually, around Christmas time. For example, at Christmas time the Bulkley & Horton Company, of Brooklyn, New York, gives a bonus to all its employees, figured on a percentage (which fluctuates according to the net profits), of the employee's annual salary or commission. The rate has averaged 7 per cent for the past few years. An additional 50 per cent of the base bonus is given for each five years of continuous service.

A bonus may be offered in years when living costs have risen, to effect a temporary raise in salaries. A large wholesale distributor, during 1919 paid a bonus of 10 per cent of salary to all executives and department heads, and 5 per cent to the balance of the employees. This was done, according to the company, "in order to place salaries and wages where they would more nearly meet rising costs of living. The bonus payments did not, however, take the place of salary and wage advances, as these advances were also made in pace with other like institutions. Yet we believe the bonus may have resulted in stabilizing the force to some extent."

When living costs remain high, or scarcity of labor necessitates continuance of the bonus, the scheme is generally changed: the bonus is made a regular part of the salary. For instance, the United States National Bank of Omaha, Nebraska, in 1917 gave a bonus to its employees, based upon 15 per cent of the previous year's total compensation. This plan was eliminated and salaries increased in like proportion. The increase to persons drawing less than \$100 per month was larger than to those drawing in excess of that amount.

Where the production bonus requires the setting of standards, the recording of production, and gauging the savings effected, waste eliminated, and so on, the most successful practise is noted where employees have a voice in the establishment and operation of the plan. The experiences of one concern with a production bonus

operated by a joint committee are outlined in the plan of the Easton Furniture Manufacturing Company, given under the section on Economy Bonuses.

A TEACHING BONUS

While a group bonus plan is usually designed to foster a spirit of cooperation among the employees so that a new or backward person will be helped along by his fellow-workers, the Joseph and Feiss Company, Cleveland, has devised a special method of urging the older employees to help the newcomers.

This company pays a bonus to employees for marked helpfulness to new employees. When a new worker comes on, an older operative may be designated as sponsor for that worker. She gets a place next to the new employee, so that she can watch her, encourage her and give her helpful hints which will mean progress. This help is supplementary to the training school.

It is the sponsor's duty to acquaint the girl with her fellow workers and with the methods and activities prevailing at the shop. She may even take time with pay if necessary to be of assistance.

There are three different classes of teaching bonus:

1. A part teaching bonus of \$3 is paid when the new operative's output averages 80 per cent of the operation for five consecutive work days.
2. A regular teaching bonus of \$5 is given when the operative makes 80 per cent for five consecutive days by or within the time required by her expectancy.
3. A teaching bonus of \$3 is awarded when an operative who has reached 80 per cent reaches standard for five consecutive days.

This new plan not only gives an operative a chance to earn as much as \$8 for being a sponsor, but also gives her valuable training in the important work of factory instruction.

INDIVIDUAL AND GROUP INCENTIVES COMBINED

The experience of the National Paper Company with a plan covering the individual employee's production led the company to see the advisability of also providing a more general incentive for employees as a group.

The Production Bonus of this company is described in the following statement by a manager of the concern.

Under this plan every machine we have in the house is rated for its production and for all work produced above the rated production of the press, the operator gets a certain percentage, the foreman gets a percentage, and the helper a percentage. The percentage of the foreman of the department is necessarily very small, as the foreman of the department gets his bonus from all the machines in his charge and the operator gets the larger part of the bonus, while the helper gets the smaller share.

We employ approximately eighty-four people and all employees are effected by the plan. All our printers, box makers, printing press feeders, finishers and packers, and everyone working in our manufacturing department is effected.

This particular bonus has been very successful and it has increased our production in these various departments over 33½ per cent.

We have decided to adopt another plan based on a question of departments or groups, as we think that the work of the individual in so far as the production of any particular department is concerned, is not as important as the work of the group or crew. In other words a high priced operator working on a machine could have his production cut down 50 per cent by the absence of the helper and as our aim has been to establish a permanent working force, we thought that this group plan might work to better advantage. This plan was instituted in 1919 and a certain percentage of profits is set aside to be paid as a bonus for 1,000 points, which are subdivided as follows, 333 points for efficiency, 333 points for attendance and 333 points for production.

Efficiency is judged solely by the quality of the work going out and errors in work or any other item are to be recorded by the next group or department handling the particular order as it goes through. Departments are charged with points based on the number of errors made during the bonus period, which is three months.

Attendance is based on actual attendance, the various groups or departments being charged with a specific number of points for each absence in that particular department.

Production is based on the rated production of the machines

in department in question, and departments are charged with points where the production is lower than normal and are credited with points where the production is above.

GROUP PRODUCTION BONUS, WITH SET STANDARDS

Two well organized plans for a group production bonus, setting definite production standards for the group, follow.

1. PLAN OF THE WEIR FROG COMPANY

The bonus plan of this company was started in August, 1917. Of the one hundred and eighty employees from one hundred and fifty to one hundred and seventy-five are affected by the plan, including office force, laborers, janitors, watchmen, etc.,—excluding only inspectors and executives.

The basis of the plan is the amount of tonnage shipped out of the shop in a month's period. At certain intervals a normal production tonnage for the shop is set, and posted. Then a bonus of 1 per cent of each employee's salary is paid to that employee, for every thirty thousand pounds of material shipped, over this amount. This salary is figured on flat time only, exclusive of overtime. One per cent is deducted for every time an employee is absent a day, and $\frac{1}{2}$ of 1 per cent for every time he is late. This bonus plan is applicable to everyone in the organization, with the exception of the executives, but does not apply when the men are working on piece-work.

In the opinion of O. de G. Vanderbilt, Jr., President of the company, the plan is "unqualifiedly successful, and is the greatest incentive to increasing production we have ever had. The tonnage shipped each day is posted on a board at the end of the shop, together with the normal amount of tonnage that should be shipped up to that period of the month. In this way the men

know every day whether they are running ahead or behind the normal. If they are behind the normal and are unable to make a bonus, the plan of course, is not effective, but if they are running ahead of normal, and see that they can make a bonus, it puts a great amount of energy and cooperation in the shop, and in addition, on account of the penalty for lateness and absenteeism, has served to hold these in check very materially."

2. PLAN OF A REFRIGERATOR MANUFACTURER

An incentive to increase production and avoid waste is offered by a manufacturer of refrigerators to its employees, in a weekly "production dividend."

The production dividend plan affects five hundred and fifty employees, about five hundred of them men, and fifty women. The trades and occupations affected are: woodworking, machine hands, cabinetmakers, metal workers, foundry workers, polishing workers, porcelain enamel workers, trimmers, craters, waterhouse men, yard men, office workers.

HOW EMPLOYEES ARE INFORMED

In explaining the plan to employees, the company says:

We believe that a certain share of the product of labor belongs to the workers and that another share must be used for materials, and another share to pay the interest on the plant, insurance, taxes, depreciation, management, non-productive labor, office force, advertising, etc., commonly called overhead expense.

We have opened our books to your committee from the House of Representatives and shown them that labor's share of the product is $24\frac{1}{2}$ per cent (now 25 per cent) and that share we offer to give you—no matter how large the product may be. We will treat the payroll as an advance payment, and pay you the balance the next week—which is as soon as it can be figured out.

To illustrate, suppose the product is.....	\$50,000.00
Your share is $26\frac{1}{2}$ per cent	13,250.00
Now if the payroll is \$12,000 there will remain to be added to your wages the following week, 10.4 per cent, viz.	1,250.00

Suppose the product to be.....\$60,000.00
 your share, viz., 26½ per cent, is 15,900.00
 If the payroll is as before 12,000.00
 The dividend will be 3,900.00
 or 32½ per cent to be added to your wages.
 Suppose the product to be\$60,000.00
 Your share as before 26½ per cent 15,900.00
 And by doing the work with fewer men the payroll is. 10,000.00
 The dividend would be 5,900.00
 or 59 per cent to be added to your wages.

Such a dividend cannot be hoped for as long as there are idlers and inefficient workmen on the payroll.

Now let us look at the other side:

Suppose the product is only\$40,000.00
 Your share, 26½ per cent, is 10,600.00
 If the payroll is \$12,000.00, the loss is 1,400.00
 which must be carried forward and deducted from future dividends.

So you see the matter is entirely in your own hands. It is for your interest to increase the product and at the same time decrease the payroll by getting rid of the idlers. Tell them you would rather have their wages than their company.

If work is slack in your department, and some other department is behind, do not object to being transferred to the department which is behind.

For instance, if we run two thousand five hundred refrigerators one week with five hundred men, and the next week two thousand five hundred refrigerators with four hundred and fifty men, that increases the dividend. Every dollar saved by getting the product out with fewer men goes directly into your pockets.

URGE LESS WASTE AND REPAIRS

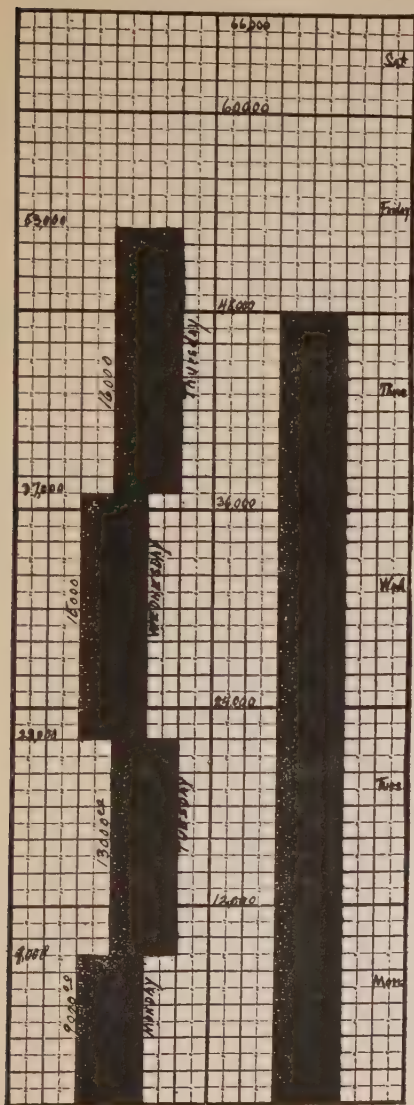
But, above all, be careful to turn out perfect goods or you will increase the number of repair men and so decrease your dividends. The company cannot afford to pay for doing the work twice, and so the wages of the repair men are taken out of the dividend before it is declared, and, besides that, poor work will ruin our reputation and business.

One way that a considerable saving can be made is to avoid the costly repair work by making the goods right in the first place, by saving material and in various other ways which you will find out for yourself, such as improvements, which you will be paid for, and short cuts for doing the work. Suggestion blanks for claiming these rewards may be obtained from your shop committee.

The piece-work in some departments and the premium system in others rewards extra work for ambitious individuals, but the profit-sharing system in addition puts the whole factory into one big family—each one working with his head as well as with his hands to decrease the labor cost and increase the product for the good of all."

Left—Actual Production

Right—Required Production

WEEKLY PRODUCTION
CHART

Suppose required production is \$66,000. Divide by 11—if you work half days on Saturday, giving \$6,000 as the Saturday production and \$12,000 for each of the other days. Move the right-hand line up \$12,000 each day and the left-hand line as far on the chart as the actual production takes it. Jog the left-hand line to make each day's work stand out by itself.

HOW LABOR'S SHARE IS DETERMINED

The company determines "labor's share" by taking the total production for the last six months, and the total payroll for the last six months, and figuring what percentage the payroll is to the product. This is explained to a committee from the employees' House of Representatives, under a pledge of secrecy, and they are told that the same percentage belongs to them, no matter what the product may be.

"Labor's share," which was 26 per cent two years ago, 22 per cent last year, is now 25 per cent. These variations are caused by the different costs of materials.

BONUS FOR INDIVIDUAL PRODUCTION

Among the plans providing a production bonus for the individual employee, according to a standard set for him, the following are instructive.

LAKEWOOD ENGINEERING COMPANY

Under the plan of the Lakewood Engineering Company, Cleveland, a specified number of pieces or a certain amount of production is used as a basis for a regular day's work. Over and above this amount of work, the company pays the worker 50 per cent of the time allotted to the job at the worker's regular day-rate.

A sum equal to the total amount of bonus paid to the worker is then set aside each day and each month is distributed prorata among all the employees of the factory. All men who work on an hourly basis are eligible for the monthly bonus as follows:

A new employee does not share in the disbursement of any monthly bonus until the third month of his employment with the company.

If an employee is absent from work three days during the month he receives only one-half of one share of

bonus; if he is absent five or more days, he forfeits all right to any share of bonus for that month, unless he is injured in the plant, or is sick. A doctor's certificate must be furnished as proof of illness.

A man who is discharged or leaves the employ of the company at any time during the month forfeits all right to the bonus for that month.

Bonuses are issued in separate checks on the 20th or the second regular payday of the following month.

2. THE BROWN HOISTING MACHINERY COMPANY

The Brown Hoisting Machinery Company, Cleveland, has a plan whereby a standard time is fixed for each operation and in case a man can do the work in less than this standard time, or in other words, turn out more work in a given time, payment is made for this additional work at the standard-rate and this additional pay is divided between the worker himself and his foreman, 75 per cent of it going to the worker and 25 per cent to the foreman. This additional pay or premium goes to the men at each pay period but in a separate envelope from that used for his regular pay. The company points out that in establishing a plan it is important that the whole plan be clearly understood by the workmen as well as by the foremen before it is put into operation, and that they be kept fully informed at all times as to its operation. The right standards must of course be set in the first place.

3. THE EMBRY BOX COMPANY

The plan of the Embry Box Company, Louisville, Kentucky, is based on the hourly production per man. The plan was established by taking the production figures for twelve months and finding the unit of production per hour per man. It was found that an average of finished

product was twenty feet per man-hour. Using this as a basis the company gave the men the full benefit of any percentage of increase in production. For example, if twenty-five feet per man-hour was the average for a week the men received a 25 per cent bonus for that week, etc.

4. EXCELSIOR KNITTING MILLS

The Excelsior Knitting Mills which employs two hundred and seventy-five has the following plan. A percentage of the total earnings of employees who do knitting, looping, or pressing is paid to them if their production equals or exceeds a set task. This bonus is added to the earnings and is paid weekly. The percentages are as follows: knitting, 25 per cent, looping, 15 per cent, pressing, 10 per cent.

ADAPTING THE PLAN TO VARIOUS DEPARTMENTS¹

[In an account of the bonus and piece-work system in effect at the Burke & James, Inc. Chicago plants, the installation of the plan is discussed with respect to three departments, viz.; the wood working, machine and camera assembly, and the box and folding camera plant.]

BONUS IN THE WOODWORKING DEPARTMENT

The wood-working department presented a problem which lent itself most readily to the adaptation of the bonus system. The grade of workmen required varies from intelligent girl machine operators to highly skilled cabinet makers and wood finishers. Because of this, hourly-rates cannot be kept standard, and it was decided to install the bonus system.

Briefly, the bonus system is as follows: A standard

¹ By William F. Ellison. 100%. p. 90-4. April, 1920.

time is allowed an operator for completing a certain operation; if the operation is completed in the standard time, he is rated as a 100 per cent operator and receives his hourly-rate. If he completes it in a time greater than the standard time, his rating falls below 100 per cent, but he still receives his hourly-rate.

If he completes it in a shorter time than the standard, his rating goes above 100 per cent and he receives 50 per cent of all time that he saves on the operation. The rates are so set that a good, honest workman need never fear that he will fall below 100 per cent efficiency.

Great care had to be taken the first few weeks in order to win the men over to the new system. Operators had to be taught how to do their work rapidly and efficiently. Especial emphasis was placed on the high quality of workmanship required, and great care had to be taken to see that the operators did not spoil any work in order to earn a bonus.

The limits worked to are considerably closer than in the average wood working shop, and this made it all the more imperative to establish correct bonus rates.

The operators have access to the bonus rates, and when a new operation is started the operator is given standard time in which he is to do the work. If, for some reason, the work cannot be done in the time specified, the rate department is notified and a temporary rate is given on the work.

For the first few months the average efficiency of this department was 113 per cent but today it is 156 per cent, and there have been no material changes in the rates.

A policy has been adopted that after a bonus rate has been set fairly and honestly it will not be reduced unless a new labor saving device is installed by the company. This has built up a good spirit among the operators.

All complaints about rates or earnings are investigated immediately and nothing is kept back from the

operator. No man is compelled to work on bonus and this very fact has brought about that every man in this department is today working on bonus and no one wants to work on day-work.

CAMERA ASSEMBLY DEPARTMENTS

The camera assembly department presented a different problem. The leather assembly is done by women and the hourly-rates are standard. The box and folding camera assembly is practically all done by men and the hourly-rates are standard. A revised piece-rate system was the logical system for this department. The leather assembly lent itself most readily to piece-work, because the work was of more uniform grade and not too complicated for women operators.

The folding camera assembly presented the most difficult problem, because of the high degree of skill required to assemble the cameras properly. It takes a long time to train workmen to turn out cameras of high quality, and it is an established rule that the high quality must be maintained and the piece-rates must be set in accordance with this standard.

The revised piece-rates are so set that an average skilled workman can earn a good wage and there are no complaints against the rates.

If an operator possibly can, he will work on piece-work; if there is no piece-rate on an operation he will make sure to ask his foreman to get in touch with the piece-rates department, so that rates may be set.

The gang chiefs in this department receive a bonus on the output of the operators in their respective groups, and this encourages them to keep the work moving at all times.

The machine department has also been placed on a revised piece-work basis. Men and women operators

receive the same hourly-wage, and the piece-work earnings are the same.

TASK AND BONUS PLANS IN CHICAGO PRINTING PLANTS ¹

Task and bonus schemes of wage payment involve the application of scientific management principles to all operations in a plant. In the use of those principles many variations have been developed. Mr. Harrington Emerson's plan of efficiency reward may be cited as one variation.

This plan of payment is based on individual efficiency, giving a reward additional to wages for certain results.² Its essential features are:

1. A guaranteed hourly-rate.
2. A lower limit of efficiency, which, if not attained, indicates that the worker is a misfit and requires either special training or change of occupation.
3. A progressive efficiency reward, beginning at a requirement so low that it is inexcusable not to average it.
4. An efficiency standard established after careful and reliable investigation of many kinds, including time and motion studies.
5. For work to be performed, a time standard that is joyful and exhilarating, therefore intermediate between depressing slowness and exhausting effort.
6. A variation in standard for the same work for different machines, conditions and individuals, the schedules therefore being individual.
7. The determination for each worker of an average efficiency for all jobs over a long period.

¹ By F. E. Wolfe. Department of Industrial Relations. *Typothetae Bulletin*. p. 5-7. January, 1921.

² Harrington Emerson. *Twelve Principles of Efficiency*. p. 363-4.

8. A continuous correction of time standards and of wage-rates to suit new conditions. This is essential and inevitable. Wage-rates rise if under the new conditions, more skill or greater effort is required. Time standards have nothing to do with wages. They are not changed to affect earnings either one way or the other, but to be accurate and just. The time standard for covering a mile is less for a man on a bicycle than for a man on foot, inevitably less for a man on a motor cycle than for a man on a bicycle.
9. The worker must have the personal option of working not to a standard time, but between limits on each side of the standard time. If he does not consider standard time fair, he can take his assumed hourly-rate and show lower efficiency, which greatly enhances the cost to the employer, whose self interest has been so to improve physical or psychical conditions as to induce the worker to attain standards.

This last principle is illustrated by Kimball in *Principles of Industrial Organization* (1913) p. 188-9, and is quoted here for reference.

To make this method clear, suppose, that a job is standardized at 120 hours. If the workman performs the task in 120 hours his efficiency is said to be 100 per cent. If he takes 240 hours his efficiency is 50 per cent. If he takes only 100 hours his efficiency is 120 per cent and so on. No bonus is paid the worker unless efficiency reaches $66\frac{2}{3}$ per cent, but he receives only his day's pay. At this point he receives a very small bonus, but the bonus increases as his performance rises, till at 100 per cent efficiency he receives 20 per cent of his day's wage as a bonus. For greater performance greater bonuses are paid, till at 140 per cent efficiency the worker receives 60 per cent of his wages as a bonus.

In the practical operation of this method by Mr. Emerson the bonus is calculated monthly and not for individual jobs. Thus, if a man's wages are \$0.30 per hour, and if during a given month he has worked 240 hours, doing in that time jobs whose total standard times have been set at 210 hours, his efficiency is $210/240=87.5$. His wages are \$72, his bonus (See Table) is 7.94 per cent of his wages, or \$5.72, and his earnings \$77.72. The advantage of this monthly award is that it tends to make the worker desirous of making a bonus on *every* job

since the averaging of a number of performances, with a few good ones would, in all probability, mean the loss of any bonus that he may have earned on these good performances.

TABLE OF EMERSON BONUS RATES

Efficiency per cent	Bonus per \$1.00 wages	Efficiency per cent	Bonus per \$1.00 wages
67	0.0001	88	0.0832
68	0.0004	89	0.0911
69	0.0011	90	0.0991
70	0.0022	91	0.1074
71	0.0037	92	0.1162
72	0.0055	93	0.1256
73	0.0076	94	0.1352
74	0.0102	95	0.1453
75	0.0131	96	0.1557
76	0.0164	97	0.1662
77	0.0199	98	0.1770
78	0.0238	99	0.1881
79	0.0288	100	0.20
80	0.0327	101	0.21
81	0.0378	102	0.22
82	0.0433	103	0.23
83	0.0492	105	0.25
84	0.0553	110	0.30
85	0.0617	120	0.40
86	0.0684	130	0.50
87	0.0756	135	0.55
87.5	0.0794	140	0.60

TASK AND BONUS IN SEVEN PLANTS

Of one hundred and thirty-eight plants investigated in Chicago seven were found which use the task and bonus method of wage payment in one or more mechanical departments. Certain main facts about the seven schemes are presented here. Of the seven plants two operate all mechanical departments on the task and bonus method; one uses it in all except the composing department, which is now being studied for its installation; one linotype composition concern was using it; and three other plants are using it for certain work in the press room or in the bindery.

The class of work in which tasks have been standardized for performance within certain time limits varies

in the different plants and departments from gathering or stringing in the bindery to difficult composition and make-ready jobs. It should be noted that task and bonus schemes are completely established in all departments only in relatively large-scale plants. The expense of installation and the volume of work performed in them make it possible and profitable to subdivide all grades of work for performance by specialists, giving the workmen specialized processes to perform.¹

Of the 3,325 total employees in the seven plants approximately 2,623 or 78.8 per cent are engaged on the task and bonus basis.

INDIVIDUAL OR GROUP BONUS

1. The efficiency rate of the individual may be used to determine his bonus. The rate of efficiency is determined by the relation of actual to standard time. For example, an ad job for the composing room is studied and a standard time of 1.8 hours allowed for its performance. The actual time consumed is 2.1 hours.

$$\frac{\text{Standard Time} \times 100}{\text{Actual Time}} = \text{efficiency rate.}$$

Actual Time

$$1.8/2.1 \times 100 = 85.7\%, \text{ the efficiency rate.}$$

The bonus on the hourly-rate begins in general in Plant No. 1 with 75 per cent efficiency. The bonus varies more or less arbitrarily for different rates of efficiency, and at 100 per cent efficiency amounts to 20 per cent of the hourly-wages.

Time studies have also been made and standard shop conditions provided in Plant No. 2 in order to set the time limits for doing work in the most efficient and remunerative manner. Bonuses of 35 per cent, 25 per cent, and 10 per cent on the hourly-rate are paid for certain amounts of work if performed respectively in A, B or C standard times.

¹ It is roughly estimated that approximately \$150,000 has been invested in the installation and developing of the bonus system in one plant.

In each of the Plants, Nos. 4, 5, 6 and 7, a fixed rate of bonus of a certain amount in addition to time-wages is paid for each thousand units of work performed in excess of a stated task.

2. A collective bonus may be used, as in Plant No. 3, where an additional percentage of wages is paid monthly on increased production in a part of the shop or in the shop as a whole. A standard monthly operation for the printing machines in this plant is fixed at one hundred and fifty machine-hours. (There are seventeen automatic machines in the plant.) A bonus of \$6 per machine is paid to all shop employees for each machine-hour operated or gained in excess of one hundred and fifty hours a month. The total sum of the \$6 bonus payments is prorated among individuals on the basis of their wages.¹ In addition, a special bonus of \$1 is paid to the pressman and his two assistants attending a machine for every machine-hour gained in the month. One-half of this bonus goes to the pressman and one-quarter to each of his assistants.

DEDUCTIONS FROM BONUS AND NOT FROM WAGES

Slow and inefficient performances on task work reduce in any case the possible amount of bonus. In Plants Nos. 1 and 2 any deductions for spoilage or inferior quality of work are made from the bonus and not from wages. If a spoilage occurs and the bonus of the responsible person is taken away, any balance of a deduction is never carried over to the next week or the next month.

Increases are estimated to have been realized in the output under the task and bonus schemes, ranging from 17 per cent to 50 per cent in three plants. The management of the companies in all plants were wholly

¹ To calculate an employee's share of the collective bonus, multiply his weekly-wages by number of days at work in the month to get the number of points assigned the employee. Divide the sum total of the points of all employees into the total amount of extra compensation to be paid, and multiply by the individual employee's number of points. The result will be his share.

convinced that production was greater than it would have been under the old methods.

OPPOSITION OF WORKMEN

Of the seven plants operating mechanical departments in whole or in part on a task and bonus basis; it will be observed, four are non-union or open shops, and three are union. The three plants where task and bonus are used in a comprehensive form are non-union. This is on account of the inveterate hostility of organized labor to task work schemes as hitherto operated. In one union shop certain operations continue as task and bonus work without active union opposition, because for many years those operations have been so conducted. In another union shop where a bonus on output was offered and paid for a time during the past year, union opposition resulted in its discontinuance. In two other union plants certain operations in the bindery are task and bonus work. The union in these cases does not favor the method, but for strategic reasons has not yet made its opposition the occasion for a clash and a final adjustment. Some of the union shop employers reported that they were restrained from installing in their plants a complete task and bonus system by union opposition.

THE ENDORSEMENT OF EXPERIENCE

What does the experience of seven Chicago printing plants with the task and bonus method of work and wages payment show?

1. Of seven plants, two operate all mechanical departments on the task and bonus method, and another operates all departments except one where time-studies are in progress preparatory to its introduction there.

2. One concern was discontinuing its use because union employees were required by union regulations to refuse task and bonus payments. Any employer adopting a production bonus would encounter the strongest antagonism of union labor.

3. Three other plants are using task work and bonus payments only to a limited extent in the press room or in the bindery. In the strict sense, these plants as a whole operate on the straight wages system.

4. Relatively large-scale plants are best adapted for the successful introduction of a task and bonus scheme. Reasons for this are: (a) large volume of business with resulting possible subdivisions of the work of the trade into simpler processes; (b) heavy capital investment necessary; and (c) greater strength to withstand union opposition.

5. The employers, whether open, non-union or union shop, are unanimous in reporting that production per employee is greater when employees are on task and bonus work.

6. Some union employers felt the restraint of union opposition and were prevented by it from extending the bonus scheme throughout their plants.

GENERAL CONCLUSIONS

1. Task and bonus schemes bring with them possibilities of enormous increase in productive efficiency.

2. Emphasis upon knowledge of facts as to efficient plant organization and upon measurement of actual work accomplished by each man as a basis for wages suggests the value of a concrete method of approach to all other aspects of industrial problems. Among these other aspects about which facts should be gathered are the effects of task work upon the longevity, health, absenteeism and regularity of employment of the workers.

3. Efficiency bonus schemes as administered heretofore are defective because arbitrary judgment is depended upon to decide whether bonus payments shall begin in a particular plant at 66⅔ per cent, 75 or other per cent of a standard time performance, what the rates of bonus as well as the standard time limits themselves shall be, and what, if-any, penalties and deductions should be

imposed for spoilage and inferior work. However well-intentioned the management of a plant may be, the power thus to set time limits for efficient work and to alter them as conditions change may be easily misused in actual operation by subordinates so as to undermine the morale of the working force.

4. Any bonus scheme under which it is impossible for the workmen to understand how to calculate their individual bonuses each week is a source of mistrust, discontent and complaint. These conditions invariably tend to produce an excessive labor turnover.

5. The contention of organized labor that task and bonus work is a "driving," "nerve racking," "speeding up," "sweat-shop" scheme for keeping wages low and increasing the employer's profits is mentioned here only for what it is really worth. Complete facts and proof to the contrary are the best means of refuting exaggerated charges at this point. Educational measures may also be used to overcome uninformed opposition and prejudice against sound methods of improving individual efficiency.

BONUS FOR TYPISTS¹

Briefly stated, this is a bonus payment plan based on an actual quantity and quality measurement of work done.

When we decided to try out some such plan in one of our departments, we thought it best to prepare the ground thoroughly. We did not want to waste effort, time, and money in too much experimenting, and so we went at the problem with a view to preparing everything that might affect its successful carrying out under the most favorable conditions.

WHY WE FELT WE MUST FIRST STANDARDIZE

We realized early, that before installing bonus systems based on comparative amounts of work for groups

¹ By H. O. Kent. Montgomery, Ward & Co., Chicago. System. June, 1918. p. 898-900.

of workers similarly employed, it would be necessary to standardize as far as possible all equipment, details, and methods before a fairly apportioned task could be set for any given length of time.

The first thing for us to go after, then, was the physical arrangement of the desks and chairs of the operators. These with us were already quite satisfactory. A table had been standardized which occupies the least floor space consistent with adequate provision for working materials, while the standard chair is one on which the height of the seat, height of the back support, and the angle between the seat and the back can be regulated. The back is pushed forward by a spring and thereby offers support to one sitting erect. When this chair is used with the foot bar, which we also think is necessary for ease and speed in working, the operator can keep a correct position with comfort throughout the day.

Detachable racks and cabinets suitable to the particular kind of work for which they are used have been designed and are being installed as rapidly as possible; later on, therefore, we hope to be able to show even better results than those we are telling about in this article.

HOW WE HELP THE WORKERS INCREASE THEIR OUTPUT

We also taught the stenographers, typists, and operators how they could most economically handle their stationery to consume the least possible time in placing it in the machines. We reasoned that haphazard ways of performing these operations would be a source of considerable variation—in the long run—in the operator's bonus; but if she were taught the easiest and quickest way in which to make each movement, she would in the end be able to accomplish just so much more.

Here, for instance, are a few directions from the set of instructions worked out—each of them is now fully explained to the new worker:

When you make your pick-up of letterhead and manila paper, reach over to the cabinet but once and bring away all papers with the left hand. While picking up these papers in the left hand take up the carbons in the right hand and bring all papers together at the left of the machine. Place the carbons as nearly in the correct position as you can with one movement of the hand for each carbon.

Place envelopes in the pigeonhole face up and flaps turned away from the machine, turn the wrist as you carry them to the typewriter, and they will be in the proper position to insert.

Tie your eraser to the typewriter on the side of the stronger hand. Three or four rubber bands linked together are better than a string.

The last rule, though perhaps a seeming trifle, becomes really quite significant when you multiply the time consumed in the search for the eraser by the number of times a day the search is made and by the number of girls. A low estimate is one erasure for each letter one-sixth of a minute to find the eraser each time, one hundred letters a day, or an actual loss of about fifteen minutes a day for each worker for this simple cause.

It was our desire to base payment as nearly as possible on the actual output of the persons affected, and so the foundation of the system had to be an accurate method of measuring the output. The square-inch method of measurement—that which measures areas of typewritten matter—we found would not give the accuracy we required. One of its deficiencies, for example, is that it does not make allowances, without extra figuring, for paragraph spacing, which varies considerably with different correspondents. One operator, transcribing the letters of a man given to frequent paragraphing, could gain an undeserved increase in bonus over other operators.

Therefore we made our unit of measurement the line, with a standard length of six inches. The margin bell was set to ring just before the full length of the line had been reached by the girl.

OUR PLAN FOR MEASURING EACH WORKER'S PRODUCTION

For measuring letter length all that was needed, then,

was a scale which would give us the number of full-length lines. Two scales, transparent celluloid rectangles six and one-half inches wide and nine and one-half inches long, were worked out to take care of the different spacing between the lines on the two makes of typewriters we had standardized on. The vertical lines at the right are to guide the measurer in seeing at a glance that the standard length line is written.

The work is measured by observing the total number of lines in the body of a letter as shown by this scale and noting on the record sheet with the number of paragraphs. There is a double spacing between paragraphs and under the law of averages we find that the average of the end lines for the day equals a half line. Therefore the equivalent of one and one-half lines for each paragraph in the letter is deducted from the total number of lines.

There are also a number of what we call "recurring factors" in each letter, such as the time to take up and insert the paper in the machine and to type the name, address, date, salutation, closing, and the initials of the correspondent and typist. By time study these were determined in this particular division to be the equivalent of five line-units. This varies slightly in different departments according to the nature of the work. At the end of the day the number of line units of work accomplished by each operator is obtained by the total number of lines measured, less one and one-half times each paragraph, plus five times the number of letters written. Special allowances are also made for special kinds of work.

So much for the plans that have to do with the actual computation of output. Our next consideration was the reward. Careful time studies showed that an output of one hundred and fifty lines an hour was a fair task. By this is meant that a reasonably good operator can produce under standard conditions and without undue effort for a period of eight or nine hours a day this amount of work, and that she can increase this amount

by at least 100 per cent as she becomes more proficient in her work and more nearly an expert operator.

The proper salary to pay for this standard output was determined by an analysis of comparative wages on similar work in other industries, as it is our desire always to pay at least a little better than the market demands with the bonus earnings as an entirely supplemental reward.

MAKING THE RATES FAIR FOR EVERYBODY

In addition to experienced operators, we employ beginners who have just graduated from school and others with but little experience. To give all of them the proper incentive to improve their work, the scale was graded several steps below the standard, so that these beginners would still have the incentive of the bonus.

Figuring from the standard we determined ninety lines an hour as the proper output for a beginner and graded the output for each \$1 increase in salary as is shown by the scale below. "X" is used to indicate the beginner's salary and "Y," which is \$6 a week more, is the standard salary:

HOW "LABOR'S SHARE" IS DETERMINED

Over 150 lines an hour.....	\$Y	and bonus
Over 140 lines an hour.....	\$(X + 5)	and bonus
Over 130 lines an hour.....	\$(X + 4)	and bonus
Over 120 lines an hour.....	\$(X + 3)	and bonus
Over 110 lines an hour.....	\$(X + 2)	and bonus
Over 100 lines an hour.....	\$(X + 1)	and bonus
Over 90 lines an hour.....	\$X	and bonus

The fact that the salaries can be indicated by symbols shows the flexibility of the system. As the standard output was scientifically determined at one hundred and fifty lines an hour it remains constant, but the values of X and Y can be and are being increased to amounts consistent with general labor conditions.

Now, just what does this scale of wages mean in actual practice? It means that when we employ a young woman at the standard salary we expect her to be able

to get out one hundred and fifty lines of typewritten copy an hour for forty hours each week. She may be able to produce that much, and again she may not. But her weekly record as it is reported by the measurers will soon show us her comparative value.

And that I consider as one of the chief advantages of the installation. For we never cut down the salary even if the worker is employed for much more than she really earns. But when slack periods come or changes make it necessary to redistribute workers, we can lay off or put at other work girls who are not earning their salaries. This eliminates the guesswork which is really the chief cause of "firing" in so many offices.

This weekly record is also the basis for promotion of those who deserve it to secretarial and other better positions, and thus further rewards for loyalty and length of service.

Of course, accuracy in letter writing as in any other work is of more importance than speed. So we graduated the payment for output in such a way that a worker will make more for accurate and neat work at less speed than she will for a greater amount of work marred by mistakes.

Therefore we established the following rates of payment—for the excess over the regular salary—for stenographers and dictating machine operators:

- 10 cents for 70 lines—
rate of payments if no errors are made in a day
- 10 cents for 100 lines—
rate of payment if 1 error is made in a day
- 10 cents for 120 lines—
rate of payment if 2 errors are made in a day
- 10 cents for 150 lines—
rate of payment if 3 to 5 errors are made in a day
- No bonus is paid if more than 5 errors are made.

The scale is based on our rule of paying at least 51 per cent of the savings over the required output to the worker. In this instance it is considerably more for perfect work.

FINANCIAL INCENTIVES FOR

BONUS REPORT FOR WEEK ENDING MARCH 9

Name	Activity	Hours Worked	Rate per Hour	Units Produced	Units Task	Excess	Bonus	Total Errors	Basic Rate
Vering	Operator	33.76	274.3	9262	5064	4198	5.67	1	150
Kavanaugh	"	49.17	163.5	8038	6884	1154	1.79	0	140
Diestlow	"	28.99	157.9	4579	2899	1680	2.40	0	100
Resch	"	38.78	155.6	6034	5429	605	.88	2	140
Olund	"	39.74	153.2	6088	5564	524	.75	0	140
Mullins	"	44.51	126.4	5626	5786	-160	-.23	0	130
Sheehan	"	48.75	120.9	5898	5850	48	.07	0	120
Wintz	Typist	20.92	193.6	4050	3138	912	.80	6	130
VanDorn	"	42.01	157.6	6620	5797	823	.70	5	138
Baron	"	30.34	126.2	3831	3792	38	.04	7	125
Friemel	"	39.26	111.2	4363	4436	-73	.05	8	113
Stepanek	"	42.00	106.3	4464	5796	-1332	-1.33	5	138
Landy	"	45.50	94.6	4306	5142	-836	-.84	11	113

This sheet is the weekly bonus and production record of one group of stenographers and typists. A report similar to this is made every week, and shows the manager the exact amount of work done by each operator, and the number of errors. It indicates also how each compares in value with all the other girls in her department.

The scale of wages and rates of payment for typists are slightly lower than these tables, because of the nature of the work; but typists are promoted as soon as they are qualified, which gives them an incentive to learn the other classes of work. It may seem, too, that the dictating machine operators have an advantage over the stenographers in that they need to take no time off for dictation. The disadvantage—quantitatively measurable as a loss of approximately one-fourth of their bonus-earning time—is more than offset, we think, in the greater chance the stenographer has over the operator of passing into other work, such as that of a private secretary.

A count of the errors in each day's work is turned in by the correspondents to the supervisors, who also keep a record of each girl's time so that her bonus will be figured only on the time she has actually spent in typing. This eliminates any chance that her bonus earnings will be unfairly reduced by necessary interruptions for taking dictation, for special work, or for some other cause.

Each batch of letters goes to the measurers, who record simply the number of lines and paragraphs, with the girl's time-clock number. From the two records, the error count and the output totals, the bonus is worked out at the end of each week.

This bonus plan has proved more valuable even than we had hoped. It has cut typing costs in the department in which it was worked out—we are now gradually installing it on other general typing activities—by about 25 per cent. The addition of two girls and part of the time of a third for measuring and figuring bonus for nearly one hundred workers is only about 3 per cent of the payroll of the department. Output as a whole has increased 50 per cent.

Best of all, perhaps, we have a reliable record of what the individual workers can really do. We can pick out those who are worth their wages to us and those who are not—not a negligible advantage at a time when it

behooves us all, in whatever business we are, to make the most of labor and time.

WHAT WE HAVE TO CONSIDER IN GRADING WORKERS

It is seen that under this method the lowest-salaried workers are not necessarily the least valuable. They may be earning their pay and the higher-paid girl—who has been employed on her past record of experience and salary—may fall far short of hers. The only criterion to consider, then, is whether the output (quality and quantity) is commensurate with the salary. In employing new workers, we engage the best available, paying according to previous experience and past earnings.

We have now considered the advantages to the company, but the fact must not be overlooked that the workers have also greatly profited by increased guaranteed wages and additional bonus earnings. Some individuals have gone much farther than the average, in some instances getting out up to 100 per cent more work than before this system was adopted.

This increase is due, undoubtedly, to the fact that salaries rise just as fast as output consistently grows. A girl who for three successive weeks adds ten extra lines an hour to her wage standard automatically passes into the next higher group, receiving an additional dollar a week in salary. Her bonus earnings are then, of course, figured on the excess output above the output standard corresponding to her new wage.

One girl's record illustrates the possibilities for the worker. About a year ago this girl came to us as a beginner typist just out of school. About eight months ago she was placed on bonus to start at the same salary. She immediately began increasing her output and raised her salary every few weeks, until she is now receiving as a dictating machine operator \$7 a week more than her starting salary and in addition a \$2 or larger bonus

regularly each week. Some of our other operators are regularly earning \$5 to \$6 weekly besides the maximum guaranteed wage; they have besides, of course, advancement to other work to look forward to.

BONUS SYSTEM IN FORGE SHOP¹

The shell forging plant of the Hydraulic Pressed Steel Co., Cleveland, consisted of five complete units, which were named *A*, *B*, *C*, *D* and *E*. The men were paid an hourly-rate plus a bonus for increased output based on the plant as a whole. At the start, production was only moderate, the men being satisfied to pool their earnings with the other units. It was soon noticed, however that *A* unit worked more smoothly than the others, although *B* unit was equaling its production. Considerable rivalry sprung up between the two as to which could produce the most forgings. Meanwhile the rest of the units were struggling along with only fair or indifferent results. One night a workman on *D* unit shouted to his helper, "We should worry, *A* and *B* are going fine, why should we kill ourselves?" An analysis showed that *A* and *B* had been getting less earnings than they were justly entitled to and the others were getting more than their share. Each unit was put on its own merits. Production did not jump immediately, as it took several weeks to weed out the laggards, but within a reasonable time the number of forgings turned out in that plant more than doubled.

The Hydraulic Pressed Steel Co. has an interesting method of paying these men. There were twenty-one men, who worked for a base-rate of 35 cents per hour. The more skilled, who were called No. 1 men, worked for a base-rate of 35 cents per hour and

¹ From a paper presented at a meeting of the Industrial Association of Cleveland, by George C. Brainard, General Manager, Hydraulic Pressed Steel Company, Cleveland. *Iron Trade Review*. p. 247. July 22, 1920.

the other at 30 cents per hour. As a day's work of eight hours, a rate of three hundred forgings was established and it was possible to make them in an hour if everything worked smoothly. For all over three hundred forgings 6 cents was paid, which was equally divided among the twenty-one men, and they averaged between \$8 and \$10 per day. The reason for the low hourly-rate was that breakdowns and tool changes occurred frequently, causing shut-downs from fifteen to twenty minutes to several hours, but no matter what time during the shift a breakdown occurred their one idea was to get it going again to make the bonus.

A similar scheme was applied to an assembly proposition in the frame shop. Originally there were thirty-three men in the unit, and a rate was set. Production ran along smoothly. One day one of the men asked if the rate would stand if of their volition they cut down the number of men on the unit. After being assured that it would be maintained, men were gradually eliminated from that unit until only twenty-three were left. They very materially increased their wages and there was no expensive turnover. The company gained by reducing the percentage of overhead and the men made more money. These men became very expert on particular operations and materially increased production over the previous records set by thirty-three men. The writer is thoroughly convinced that the job of every man in the plant must be measured and a normal output determined for it. Then employers must pay extra to the individuals for all work over normal. If an incentive of some kind over and above an hourly-rate is not furnished the highest possible production cannot be expected from them.

EXPLAINS POINT SYSTEM

The idea of the point system is briefly this: First the normal standard is determined for every operation, this normal being equivalent to the time required by a normal

man under normal conditions to perform a given operation. Every man of the same degree of skill has the same basic-rate so that all are on an equal plane, that of the same base-rate of production measured by the same normal standards. All production over normal is then paid for in direct relation to the man's rate per hour, giving extra pay in direct proportion to extra results.

This extra pay is divided 75 per cent to the man, and 25 per cent to supervision, as both are paid normal rates for normal production and both must cooperate to produce more than normal. Since it is the management's responsibility to furnish men with work at all times, any failure to do this, is allowed the man at his normal productive rate per hour. He then has the protection, first, of his basic-rate per day; second, of guaranteed standards, and third, being assured by management that it will assume responsibility for its failure to provide him opportunity. Thus his earnings are always in direct relation to his efforts.

IMPORTANCE OF COST KEEPING

The cost of any manufactured product may be subdivided under material, productive labor and overhead. A factory cost accounting department usually confines its efforts to accurately finding and recording the cost of material, productive labor and such overhead as may specifically apply to plant operation. This information is then transferred to the general accounting department where records of all other expense under overhead are kept and the difference between the cost as determined by them and the sales price means profit or loss.

Systems for quickly bringing accurate information to the attention of the factory or production managers are necessary. The degree to which prompt and efficient attention is given to known running costs, checked against previously estimated costs, measures the difference between profitable and unprofitable production.

Every effort should be made to know as much as possible of the daily standing and cost of each job in the plant, plus as much as possible of the general operating cost. It does not do anyone any good to know on the twentieth of next month that a certain job completed the first two weeks of the month entailed a loss. It is too late to do anything about it. We must get right down to a basis of knowing about production costs daily. Plants operating on piece-work or standards largely predetermine shop costs. However, in many cases minimum day-rates are guaranteed and costs have to be figured on all jobs which fall below standard. The list of below-standard jobs shows immediately where attention is needed in the factory.

Cost finding is one of the most important functions in any manufacturing business. In many plants it is looked upon by the operating force as a necessary evil. Perhaps this is due to the fact that boys are used who cannot realize the importance of doing their work accurately, while the value of any cost accounting department depends almost entirely on how accurately and how quickly it secures and tabulates detail shop information into usable form. Men must be trained to understand the responsibility of their jobs. After factory data is collected three kinds of records are necessary: First, daily reports to the factory or production manager; second, permanent records of costs by jobs for future estimating purposes, and third, general operating costs for purposes of periodic comparison and for use in keeping the general books of account.

It is advisable to have the cost accounting department closely harmonize with the general accounting department. One of the most useful figures in business, particularly for purposes of comparison, is the sales dollar. By resolving each dollar of sales back into its elements—so many cents for material, so many cents for overhead and so many cents profit—the simplest kind of figures to work with are found.

THE BONUS SYSTEM APPLIED TO MINING¹

Several articles have appeared lately in various technical publications, dealing with the bonus or contract system as applied to underground labor, but in all this mass of information and opinions there is one important consideration that has not been dwelt upon. In mining work the Blue Bell mine is trying to adopt a bonus system, which works out with excellent results in a shop where the piece-work system is successful and where it is possible to limit the operations and movements necessary to do a certain job; but when attempt is made to adopt the method underground, it often fails miserably, which is due to the many variations in the character of the work.

Occasionally there are certain classes of work which can be placed on a definite bonus system and which will work out satisfactorily both for employee and the employer—such work as shoveling in a large stope where there is a constant supply of broken ore, or in tramming ore or waste on a level where the operation is definite and the supply more or less regular. Also certain classes of work, such as drilling in a large stope where the conditions from day to day do not vary too greatly, or in driving a drift or crosscut where the ground is uniform in character.

DELAY IN COMPUTING BONUS BREEDS DISSATISFACTION

When such conditions are constant enough one is able to estimate a certain task for a day's work, and any unit of work above this task can be used as a unit for a bonus to the workman concerned. The amount to be paid is generally determined at the end of two weeks or a month, as the case may be, and at the end of that period the company engineer measures up the particular working place and calculates what the daily output has

¹ By W. V. De Camp, Mine Superintendent, Blue Bell Mine, Mayer, Arizona. *Engineering and Mining Journal*. 105 : 461-2. March 9, 1918.

been; after which a bonus notice is posted to the effect that John Doe has earned a bonus for the period of a certain amount per day. John Doe, on seeing this notice, if he happens to think he has earned more than is stated, is inclined to be peeved, and decides in his own mind that the system is a fake and designed for the company alone; that he will get paid only a certain amount anyhow. As a result he ceases to put forth any effort toward earning a bonus, and since he waits fifteen or thirty days to find out what his earnings were, he is likely to slow down to a leisurely pace and forget about the bonus.

The above statement is made from observation during many years of effort to institute a bonus system for general mining work that will be satisfactory both to the employee and the employer, and carries a full realization of the many difficulties to be expected. As a result of this experience the conclusions I have reached are that the principal fault lies with the employer, in that he does not give his bonus system sufficient supervision; and both close supervision and a daily check on results are necessary to success.

For the average miner or laborer working under a bonus system it is not sufficient to know the results of his labor every fifteen or thirty days. He should know positively at the end of every working day, or before he goes to work the next shift, what he has earned. This is not a new idea by any means, but it is a psychological fact that whatever one succeeds in impressing most forcibly on an individual's mind will eventually become his most marked point of view. To apply this to mining close supervision is essential, and it becomes necessary to reduce the number of men working under each boss or, what I consider much more satisfactory, to employ a separate checker to handle bonus details for from thirty to forty men. This man can be directly under the shift boss, but gets his bonus rates from the mine office, as determined for the various working faces, and is directly

responsible to the office for the results of his work. He should be supplied with record cards showing the working place of every man and should detail on these the class of work and the amount of bonus earned by each. The card records can then be summarized daily, and a notice posted to the effect that certain men have or have not made a bonus. It is just as essential that the bonus earners be posted as it is for those that have earned none. By posting the notices daily every man is made acquainted with the earnings of himself and others.

The bonus idea should thus be kept alive in the minds of the men, and if any question arises it can be brought up and settled at once. The miner working in a drift should know just how much ground he is breaking per round, which makes daily measurements of every heading necessary. The cards for each working place should state the time lost due to causes not under the control of the man, and the shift should be divided into two parts. Thus if a miner is held up all the morning by being forced to bar down a dangerous back, and in the afternoon does an unusual amount of work, he should receive credit for the full shift at the same rate of earning he has made during the afternoon. Bonus rates should be posted on each level or at the entrance to each working, and every new man starting to work should be made fully acquainted with the methods in use and rates of pay and bonus.

This may appear complicated to the manager, and the idea of increasing the number of bosses and clerks will probably meet objections, but once the confidence of the men is obtained and the system well started it will work out nicely and will tend greatly toward maintaining or increasing the average rate of the work performed.

CARE ESSENTIAL IN FIGURING BONUS

As to the method of determining the bonus to be paid in a particular case, I have found that one cannot be too

careful in establishing this figure, and, once established, the rate should not be changed except in the event of a change in wage scale or the adoption of some new condition or mining method that would make the old rates impossible. Careful records of past performance and a study of actual conditions should be made as the basis of the rate, and I have found that where a certain amount per man has obtained for a certain period it is well to accept this as the base rate and begin the bonus from this point, increasing at a regular rate as the work increases. In the event, however, that the employer feels that the average has been entirely too low, it is well to begin at a low rate and gradually increase the unit rate as greater output is obtained.

As an illustration of the first case, assume a carman trams thirty cars per day from a certain chute. The cost to the company on a base-rate of \$5 per day will be 16.67 cents per car. With a bonus based on 50 per cent of the cost the carman would therefore receive, say 8 cents per car for every car over thirty. If he can save a little time at the beginning and end of the shift and not "take five" too often, it would be quite possible for him to increase his output by four cars, thereby increasing his wages 6.4 per cent and decreasing the cost per car to the company by 6.06 per cent. This means a direct saving of approximately 34 cents per carman per day for the company. If the same amount could be saved on the labor of forty men, it would be sufficient to pay the wages of the extra boss and leave a good margin for the company.

In a drift where the average footage advance has been four feet per round at a total cost of \$20 for miners and muckers, or \$5 per foot, the bonus to each man working, assuming the employment of two carmen and two miners, might be placed at 50 per cent of the total saving made. Thus: 4½-foot advance at \$21.25 costs \$4.72 per foot, and 5-foot advance at \$22.50 costs \$4.50 per foot. A direct return to each man at the 4.5-foot

rate of 31 cents per day and of 62 cents in the last case.

One thing that should never be attempted is to so arrange the bonus that it will always be constant. I have often heard mine superintendents say, We want our better class men to earn at least 25 cents per day more than the scale. This is a grave mistake and one that will result in the slowing up of the men, as the incentive is then taken away, since this constant bonus, in the eyes of the men, will mean nothing more after a certain period than a straight increase in wages, and they will lose sight entirely of the bonus idea. This was aptly illustrated a few years ago in the copper mines of Arizona. When copper went up the companies raised wages a certain amount per unit increase in copper, with the result that every man, from the mine superintendent down, felt, after the lapse of a few months at the increased wage, that his value to the company was the total wage paid, and lost sight of his base-rate entirely. If the companies at this time had taken the trouble to issue two different checks for each period worked, one check for the number of days due at the base-rate and the other check of different color for the copper bonus paid, it would have resulted in every man's looking upon that bonus check in an entirely different light and would have kept constantly in mind his actual base-rate and the amount he was earning because of the increase in the price of copper.

The bonus or task system, to be entirely successful, should be handled in a similar manner, and if rules were to be established for a bonus system they should be grouped as follows:

1. Never change a bonus rate.
2. Notify men daily of amounts earned.
3. Notify every man when he starts of the exact conditions under which he is working, bonus rates, etc.
4. Keep the bonus idea constantly in mind.
5. Pay all bonus by separate check.

BONUS PLAN FOR AUTOMOBILE SERVICE STATIONS ¹

All mechanics employed in the service station of Black & Maffett, Dodge Brothers distributors, of Atlanta, Georgia, work on what might be called a combination salary and bonus system.

Based on the law of averages we have devised a schedule of the time required to complete almost any job that is brought into our shops, and the work of all of our mechanics revolves around this schedule. Each mechanic is required to fill out a card for every job. This is known as a time card and it carries the workman's number and also his name, the number of that particular job, the date and the exact work that the mechanic performs. The mechanic is also required to write down on this card the exact time of day he started on this job, the time he finished the job and the total number of hours he devoted to it.

TIME CARD

Workman No. Name of Workman

Job No. Date

This is the time card and carries the workman's number and name, the number of the job and the work he is to perform. The mechanic writes on this card the exact time he started and finished. There is a card for each job and all the cards for the day's work are turned in and totalled. The schedule time for all the day's jobs listed by the cards are then totalled and the difference shows whether a bonus is to be paid or not.

Time Started..... Time Stopped..... Total Time on This Job.....Hrs.

¹ By Jesse M. Bohler, Service Manager for Black & Maffett, Automobile Distributors, Atlanta. Motor Age. 38 : 10-12. October 21, 1920.

Now, then, at the end of each day the clerk in charge of these records will total the number of hours the mechanic actually worked that day. This is taken from the time card which he has filled out, and remember there is one card for each separate job. If the mechanic has not loafed at all during the day this total will be nine hours. Then the clerk will total the scheduled time for each particular job. If the mechanic does in nine hours certain work that our schedule allows twelve hours for, he has gained three hours. However, the following day he might work the full nine hours and turn out work scheduled for only six hours. In that case he will lose the advantage he gained the day before and will stand just even.

Our final totals and our bonus figures are made up at the end of each month. To best illustrate exactly how this plan works let us, for example, take the case of John Smith. We will say, John is an extra good mechanic. At the end of the month we find that John's time cards show he has worked steadily the whole month and has put in, we will say, a full two hundred hours. We find that John has turned out a certain number of jobs that our job time schedule shows we allow two hundred and fifty hours for. In that case John Smith will receive a bonus check equivalent to fifty hours of work at his regular rate of pay. Suppose that John receives seventy cents per hour; his bonus check for the month will amount to \$35.

On the other hand, let us take the case of Bill Jones. We find that his time cards show he has put in one hundred and eighty hours in actual work. Evidently he loafed a bit, but regardless of that fact if his cards show he has exceeded the scheduled time we will pay him extra for it. Well, let's see how. In one hundred and eighty hours we find that Bill has turned out a certain number of jobs and that the total time we allow for these jobs according to our schedule is two hundred and one

hours. Inasmuch as the clock time for the full month was two hundred hours, Bill is entitled to a bonus equaling one hour's extra pay. In this case it would be sixty cents, for Bill's rate is not as high as that of John Smith who has been with us longer and is a better mechanic. It may be that there wasn't quite enough work in the shop to keep Bill Jones busy the full two hundred hours, or it may be that the twenty-hour loss between his time cards and the time clock is due to his own habit of loafing. In either case if he had put in that extra twenty hours in actual work he might have made an extra \$10 or \$15.

CAREFUL CHECK AVOIDS MISTAKES

On account of the fact that each mechanic's time is registered on the clock it is not possible for any of them to cheat, even were they inclined to do so, by incorrectly filling out their cards. We would naturally catch a man at this by comparison of his time card with his clock record. Each mechanic is required to fill out this own cards in his own handwriting.

These individual records are kept in a book that we have devised for this special purpose. The book contains each mechanic's name, his clock number, and space is provided for entering his clock time, card time, idle time and schedule time. These entries are made by the clerk in charge of these records every day, and we can tell at a single glance just how much any particular mechanic is ahead of the game, or behind as the case may be.

Every mechanic's clock time will run nine hours, unless he happens to be off for some reason. His card time should, of course, correspond exactly with his clock time providing he has worked steadily the whole day. If he has not worked steadily the whole day then we enter his idle time under that heading.

Now as to the column for schedule time, perhaps a little further explanation will not come amiss. Every job

that comes into our shop is scheduled according to the time it would require an average mechanic to accomplish. This is based, as previously stated, to more or less of a degree on the law of averages. And furthermore the customer is charged for the work according to this scheduled time, so you see where we make our gain when the mechanic is able to beat the scheduled time.

On the other hand if the mechanic cannot beat the scheduled time, but instead takes longer for the work, you can see where this is a loss to us. And naturally we will not keep a mechanic long in our employment who persistently takes longer for the work than the schedule calls for. *One of the big advantages of this combination salary and bonus plan is that it gives us at all times the fullest information as to the ability, or lack of it as the case may be, of every mechanic in our shops. And when a man asks for a raise it does not take us a moment to look up his record to find out whether or not he is entitled to it.*

Suppose a mechanic turns out three jobs in one day that we allow twelve hours for according to our schedule. Under the column for "Schedule Time" the clerk will write the figure "12." As the mechanic's clock time is nine hours, he has gained three hours that day, and if he keeps on exceeding his clock time this way every day he naturally will draw a good sized bonus check at the end of the month.

An instance is recalled of one mechanic who gained twenty hours on the schedule time the first fifteen days of the month. If he had kept this up the whole month and gained a full forty hours he would have received an extra bonus of \$28, for he was a seventy-cent-per-hour man. However, something or other happened and during the next fifteen days he fell behind twenty-two hours, so he did not receive any bonus at all.

In the case where a mechanic happens to have a big

overhaul job on hand which may require two full days or even more, he does not turn in the time card until he has fully completed the job. We have had some of our mechanics beat the schedule time by ten hours on these overhaul jobs, while in other cases they took several hours more than the schedule calls for.

We have what we term a clearing house every thirty days. In case certain work is not finished at the end of the month, we check it up and it is carried over to the next month. In some cases this may give the mechanic fifteen hours extra at the start of the new month. It depends upon his own efforts whether or not he will add more hours to this or lose the ground he has gained and draw only his regular salary. If he merely holds even during the month and the final totals show that he has just that fifteen hours to his credit carried over from the last month, he receives that extra fifteen hours' pay as his bonus.

PAID WHEN WORK IS SLACK

Naturally it is only fair to the employer, and to the employee as well, that when business is more or less dull in the shop and the mechanic has to loaf a part of the time he should not complain because he is not making any extra bonus. He should appreciate the fact that he is being paid while idle according to the clock hours, and this is exactly what we agree to do when we engage a man, although we engage all of our mechanics on the hour-rate basis.

Furthermore, we have an agreement with all mechanics that when a job comes back to them, and after our inspector has examined it carefully and decides it is the fault of the workman, the particular mechanic who did the work in the first place will do it over again on his own time. That is, if it requires five hours to do the job over again, this five hours is charged against his bonus. Should he be ahead of the game at

the end of the month this five hours is subtracted from the number of hours he may have gained.

A SAMPLE OF HOW THE BONUS PLAN IS RECORDED

Following is the manner in which the records are totalled each month, these records being taken direct from the book mentioned in the article and in which they are kept from day to day:

No.	Name	Clock Hour	Card Hours	Idle Hours	Schedule Time	Gain	Loss
1	E. M. Darling.....	206	164	2	165	0	40
3	C. C. Walker.....	216	197	10	189	0	9
7	C. D. Randall.....	207	192	0	325	118	0
17	J. N. Petit.....	208	217¼	0	231	23¾	0

Every month there is posted in the shop the full record of each mechanic who has exceeded the schedule and is entitled to a bonus. Below is a sample of a recent bulletin:

Clock No.	Name	Gain, Hours	Rate per Hr.	Bonus
34	H. E. Schlittler.....	26¼	.80	\$21.00
33	W. A. Posey.....	64¾	.70	45.32
7	C. D. Randall.....	55¾	.80	44.20
3	C. C. Walker.....	¾	.60	.45

In case he is not ahead of the schedule this five hours is charged up against him every succeeding month until such time as he shall beat the schedule when it is subtracted from his gain. Furthermore, no man is entitled to an increase in salary until he has made up through beating the schedule, all time charged against him in the past—that is, all time such as jobs brought back on him, etc. If a man persistently beats the schedule and draws down a substantial bonus each month, as some of our best mechanics do, we are only too glad to raise his salary rate per hour because such men we have found are worth all we pay them.

It is not at all an infrequent occurrence for us to pay a good mechanic a bonus amounting to as high as \$75 to

\$100 for a single month. *Naturally we get the full return on this investment for every time the mechanic beats the schedule time that's just so much profit to us.*

ELIMINATES OUTSIDE WORK

It has been our experience that a great many mechanics who work on an ordinary salary basis are sometimes apt to augment their income by working on cars on their own time after hours; they will generally do this at the owner's house. We have found that this salary and bonus plan virtually eliminates that practice among our men for if the mechanic is an energetic sort of a chap he can greatly augment his earnings by giving his full time and attention to the work in the shop. And by earning extra money in this way he does not have to augment his salary by giving any of his outside time to individual work.

All bills we send out to customers in addition to carrying an itemized statement of the actual work done, also carry the workman's clock number and the job number. At the end of the month the clerks carefully go over all these bills, check them with the inspector's card which was signed by him as to whether or not the work was satisfactory, and also check them with the workman's time card.

We also send out a card to all customers asking them as to whether or not they were entirely satisfied with the work done in our shops. Any replies that are received are filed with the duplicate bill, and therefore we have a complete check at all times on all work done in the shop as to whether or not it proved entirely satisfactory to the customer.

This checking up is done at the end of the month in order that we may make doubly certain regarding the work of each individual mechanic before we pay him whatever bonus he may have coming.

We also employ in our shop an efficiency man whose sole duties are to go around among the workmen and show them how to do this or that particular job as quickly and efficiently as possible.

PREMIUM WAGE PLAN IN MILWAUKEE SHOPS ¹

Substantial extra pay for industrious and efficient workmen, a saving to the company of some 25 per cent on the payroll, a more expeditious handling of work in the shops with consequent smaller organization and an invaluable accumulation of recorded information on detail car maintenance work are among the more important of many advantages accruing from the extensive use of a premium or bonus system of paying shop employees in Milwaukee. It has proved to be so eminently successful after six years of experience that neither company nor employees would consider a return to the old flat pay plan which was displaced. This premium system of wage payment was first initiated in the rolling stock department of the Milwaukee Electric Railway & Light Company in 1912, in connection with the washing of cars at carhouses, and it was tentatively experimented with on different classes of work during this and the following year. In 1914 it was definitely decided to extend the plan to the company's main repair shops. The plan was well started some time before the writer became associated with the organization and all credit for the pioneering work belongs to my predecessors and to many of the loyal workers of all ranks, who have supported the movement and who are now, if not at first, its most enthusiastic champions.

¹ By J. H. Lucas, Superintendent of Rolling Stock the Milwaukee (Wis.) Electric Railway & Light Company. *Electric Railway Journal*. 57 : 529-32. March 19, 1921.

Beginning with a few men and some of the more simple and easily standardized pieces of work, the application of the premium system has been extended by steps from the paint shop to the armature room and to the forge shop, machine shop and carpenter, pattern and foundry departments, in order, and lastly to the motor and truck repair division. It has been tried out and found adaptable to practically all phases of the great variety of work handled by a street railway shop, including the running maintenance, repairs and renewals and new manufacture and construction. We have covered all classes of operations, from the painting of cars, the manufacture of car and small machine parts, the construction and installation of new equipment, changing wheels and motors, rewinding armatures and even to the repairing of wrecked cars. It will be noted that at the present time 76 per cent of the working force is engaged part of the time on premium work and that nearly 50 per cent of all the man-hours time in the shops is for work done against standard time allowances and in a standard manner. The figures taken into account in computing the percentage of working forces and hours worked on the premium system are total figures which include the supervisory time as well as the time of the productive workers. Considering this, it can be seen that the premium system is a major and very important factor in our shop operation. It is so large a factor that we should be able readily to determine that the plan is a detrimental one or a very good one; that is, it either costs us money or it saves money. We shall endeavor to show that the latter is the case. For in the last analysis, the important question that the practical man wants to have answered is, "Does it pay?"

A GENERAL OUTLINE OF THE SYSTEM

The premium system employed in our shops consists, first, in making a detailed time and method study for

each job, to determine the standard method and the time required to do a certain piece of work. A stop watch is used for this purpose in most cases. The number of observations made (ten in this case) varies with the importance of the work. Our experience has shown that great care must be exercised and close scrutiny given in making the time study and before determining upon the standard unit of time or before issuing the "standard operation rate card" for regular use in the shop. In the machine shop, for example, it is necessary to take into consideration the type of machine to be used, speed, feed, material, quantity on the particular order, etc. We have found that special care in establishing a standard rate is well repaid, for it enables us to adhere rigidly to the rule that, once established, a rate is never changed except as made necessary by improved methods or improved machinery for doing the work. In other words, a workman can proceed to develop his maximum capacity without fear that he will be penalized by a reduction of the standard time if he makes good premium earnings. This rate cutting has been one of the chief objections raised by workers to the premium and piece-work systems in general in the past, and the reason for rate cutting lies primarily in insufficient consideration of all the production factors at the time the rate is determined. The details of the method, men, machines and means of doing a piece of work should be thoroughly studied, regardless of the time required to do this, and the standard can then be set close enough so that the company can afford to give the worker his share of the results of his ability and skill in bettering the time. When experience assures the men of a "square deal" they gain confidence in the plan, and this makes for a better measure of cooperation than is commonly found.

The men who make the time studies and determine the methods to be followed become very expert and command a good rate of pay and are worth it. Even

such jobs as repairing wrecked cars, which at first thought would not seem to lend themselves to standardization or an accurate estimate of the amount of labor which should be required, are now often handled on a premium basis in our shops, for analysis has determined that most of our damaged cars come within one of several classes of wrecks, either a one-post, two-post or three-post wreck, etc. The time-study man observes the extent of the wreck, carefully examines the car-body members to be replaced and, from past experience and study, is able to estimate with remarkable precision the amount of time that will be involved in making the repair. The workmen who are then given this job note the time allowed and immediately set out to beat that allowance, and they use their heads and conserve their time, for it means money to them to do so.

Any man working on a standard job is given one-half the time saved in completing the standardized operation. That is, where a man does a ten-hour job in eight hours he receives one hour additional pay, or pay for nine hours for eight hours' work. The division of the savings on a "fifty-fifty" basis between the man and the company is considered fair and equitable by both parties. The company's saving is partially used, it is understood, to defray the expense of employing time-study men and of providing the necessary standards and clerical help, in order to give the workman the opportunity to increase his day-rate earnings.

In the operation of a system like this the use of the unit system of timekeeping is a necessity. Instead of assigning daily time cards to employees the time of each man spent on each job during the day is recorded on an "operation time card."

Under the old system of timekeeping still used in many places, a time card is given to the workman on which to record at the end of the day, according to his best remembrance, each job he has done during the day

and the time it took him to do it. In most cases, he is expected also to enter the charge account number for the various jobs on which he worked. The disadvantages of this system, of course, are very apparent. It takes the man away from productive work, requiring at least fifteen to thirty minutes of his time to do "figuring" at which he usually is not adept. Jobs which do not take very much time are slighted in his record, because he does not want to go into any more detail than he has to. In some cases, a special timekeeper or checker has the duty of checking the work record with the man and his foreman and the assignment of the charge. But in neither case is the record returned anywhere nearly as accurate as with the unit job system, which we use in our premium system.

With this plan, the time card being worked on specifies one item of work. When the man changes his job, he also changes his time card. With the unit job system, the foreman determines in advance what the man's next job is to be, instructing his clerk to make out a time card showing the charge, standard operation number, the man's name, etc., and this card is placed in a rack, located adjacent to the departmental time clock, where the workman obtains it when he is ready to start work on the next job. The card on which a man is working is always turned in at night and a new card issued in the morning, as the card is a daily record only. As he takes a new card he punches the time recorder clock, which records in a decimal system the time at which work is begun on the particular job. When that job is completed he punches "out," thus printing in the time of completing the job, and at the same time he punches the new slip "in," which records the time at which he starts work on the new job to which that card assigns him, there being no loss of time between operations. The workman is not intrusted with any duties in connection with the timekeeping or record work other than merely punching the clock.

A "performance record," which is maintained in the main office of the shop, is of great value in checking up on the progress made over a long period of time. When an individual does the same job several times it is assumed that his efficiency should improve and that the time required to do the work will be reduced. This is not always the case, however, and variations from this natural tendency are followed up to determine the cause.

This performance record also makes possible a comparison of various men in doing the same piece of work. We have found cases where the time taken to do a certain piece of work, over a period of months, was remarkably similar, as far as it concerned a certain group of men, and that when this job was given to some one outside of the "ring" a considerably better record was made. The group in question had succeeded in deceiving the foreman to the extent that he thought they were doing very well, and, inasmuch as they were keeping within the standard, special attention had not been called to what was evidently an effort to control the amount of earnings on the job in question. This conniving would have some effect on the gross earnings made by the men, which would then be used as an argument for an increased day-rate. A little "shake-up" as a result of this investigation and the assignment of new men to the job results in some saving in the net cost of doing the work.

It happens now and then that the time consumed in a given job is in excess of the standard time. When a record of this kind comes through, a "non-premium card" is made out by the timekeeper and sent to the general foreman's office, from which an investigation is started to determine why more time was taken than should reasonably be allowed. The "stock" reasons printed on the back of the form are those used in connection with the work of the machine shop, and they differ, of course, for the other shops. This checking

up on the reasons for exceeding the standard time, we find, has a decidedly good effect on the men in general.

FUNCTION OF THE FOREMAN

In our method of applying the premium system, the foreman has been made an important functionary. We have arranged a bonus plan so that he profits from the extension of the system. It is to his advantage, in this way, to cooperate to the fullest extent in furthering the establishment of standard rates and seeing to it that they are used after being established. All our foremen now like the premium system, though some did not like it at first.

The foremen have found, however, especially during the last few years, that this system is a great help to them as it lightens their burdens of detailed supervision and thus enables them to give more time to the broader aspects of their jobs, such as planning of the work, devising improved methods, etc., in which they develop as leaders rather than drivers of men. The premium system supplies the incentive to reward and the check-up for failure that keeps the man on the job without some one standing over him.

The premium rates are arranged for, in the first place, largely on the authority of the foreman in the department. He has a time-study man assigned to work with him, and since his earnings from the bonus system depend on the percentage of net working time that is worked on premium in his individual department, he is interested in pointing out to the time-study man any new possibilities of jobs to be standardized. He is therefore also interested in approving these standards as correct after the time-study man has completed his work and in passing them on to the general foreman for approval.

From this procedure the responsibility for the proper operation of the rate after it is standardized rests in

great measure with the foreman, and we find that we now get rates that are remarkably accurate and standards that are fair in their returns to both men and the company. Under this bonus plan the foreman does not profit from any excess earnings that the men may make, and as the performance records are subject to scrutiny the foremen give a good deal of care and attention to the rates before they recommend them as standard.

The foreman soon finds that the system is of assistance to him because the standard rate-card file is much more dependable than his memory as to methods of doing a job, or his pocket notebook if he kept one. Most of our foremen now use the records extensively in assigning work. If his assistant quits, the foreman has an easier time in breaking in a new man. All he has to do is to hand him the standard job card on any particular piece of work and say: "This is the way to do it and this is the time it should take, if done right." The assistance afforded by these records is not as greatly needed for the day-to-day recurrent jobs and with a steady, competent gang of workmen as it is for the infrequent and varying jobs, such as wrecks, for example, which are rarely twice alike in the same week, but which do occur in almost exactly similar detail several times in a season.

GOOD WORKMEN LIKE THE PREMIUM SYSTEM

Our men like and appreciate the premium system because it is of mutual profit to the company and to them. It gives them an opportunity to work under better conditions, for they are better satisfied to receive recognition for the actual labor they perform than to be without identity, as under the former system of flat day-rates of pay. By making a man responsible for the performance of a definite task and setting a standard of attainment for him, his love of achievement, his desire for

the good opinion of his superiors and his fellow workers and his personal interest all impel him to meet the standard and better it. The instinct of competition with fellow workers is usually very strong, and the friendly rivalry which is plainly in evidence is a powerful spur to accomplishment. A good man likes to beat the record of the other fellow, and incidentally it means money in his pocket to do so. The responsibility is a steadying and good moral influence, contributing to self-development. Promotion and wage increases are based on performance records, and they afford further recognition for merit and accomplishment.

The study that has been given to individual jobs has also resulted in the remedying of inefficient shop conditions and has served to increase the general plant efficiency. More attention is being given to planning and scheduling of work through the shop. Materials are delivered to machines and work places in advance of the time they are needed, and instead of having high-priced mechanics running all over the shop to secure some little bolt or screw, this is done for them more expeditiously and at lower cost by some lower-priced laborer. Thus undisturbed in his job, the workman is enabled to devote his entire energies to production, and by increasing his production to find additional money compensation.

WHAT DOES IT PROFIT THE COMPANY?

We are certain that $33\frac{1}{3}$ per cent is a conservative figure for the average saving in time for standardized work over unstandardized. And since approximately one-half of the working time of the shop is on the premium plan, the net reduction in the payroll from this source is seen to be $16\frac{2}{3}$ per cent. To be added to this is a saving equal to 10 per cent of the total payroll hours which is obtained from the company's one-half share of the time saved by workmen earning premiums.

This brings the total profit to the company up to more than 25 per cent of what the payroll would be without the premium system. This "income" or "saving" or "credit entry," or whatever one may wish to call it, is not affected by fluctuations in the rate of wages, as is the case with piece-work and similar systems, for this plan is based on time units which do not vary, rather than on monetary values. This saving of one-fourth in the payroll or number of labor-hours used for the output of the shops is really too low a figure to represent the returns to the company, when the productiveness of the average worker on flat pay basis in the immediate past is taken into account. I do not hesitate to express the opinion that our shop force and payroll would have had to be one-third to one-half larger in number and cost during the past year had we been operating under the flat day-rate wage system.

STANDARDS BEING SET FOR EVERY JOB

Due to the extreme care which it was necessary to exercise in the observations preparatory to the establishment of the standard time for various operations, the extension of the premium system, particularly at first, was a gradual and slow procedure. As every one in the organization has become more and more familiar with the details of the plan and the time-study men have become more skilled, the expansion of the system to new work has been more rapid, until now we are reaching standards for the very intricate and infrequent jobs. It should be mentioned also that there are many corollary savings to the company, resulting from expediting the movement of work through the shops, the more exact costs returned, the checking up on odds and ends of the work, etc. These are small matters in themselves, but in the aggregate they make entries on the credit side of the ledger of considerable importance, for "a penny saved is twopence earned."

Head time-study man	1
Time-study men in various departments.....	5
Chief inspector	1
Inspectors in various departments	6
Stenographer	1
File clerk	1
Total	15

Against the credits to the premium system noted in the past few paragraphs must be charged the expense incurred for the larger supervisory, office and inspection forces required. The number of employees used in these capacities for the operation of our premium system, with a shop force averaging between five and six hundred men, is approximately shown in table above.

I question whether the time of the inspectors should be charged against the operation of the premium system. But there has been so much criticism directed against the various incentive methods for increasing production, because it is alleged that they reduce the quality of the work and increase the number of equipment failures, etc., that we have debited the premium system with the cost of the inspection department. Some would consider it necessary in any event. The net result is an increase of 2.5 to 3 per cent in the payroll to offset the 25 per cent decrease explained above.

THE "100 PER CENT TIME PREMIUM" PLAN ¹

In my mind, the only means by which maximum production per man and minimum costs per unit can be achieved is the adoption of a practical and simple incentive system of wage payment coupled with an effective control of materials, time, and expense, and the one plan which in the writer's opinion combines all these advantages is that in which the worker is rewarded in direct proportion to his accomplishments by receiving pay

¹ By L. V. Estes, President, L. V. Estes, Incorporated. Management Engineering. 1 : 231-4. October, 1921.

for 100 per cent of all the time he saves by his increased efforts.

This plan is known as the "100 per cent time premium plan," and its simplicity, practical application, and advantages can best be illustrated by the following typical examples, the first applying to individual effort, the second applying to gang effort.

THE PLAN APPLIED TO INDIVIDUAL EFFORT

In a certain machine shop a workman with a guaranteed hourly-rate of 55 cents was assigned to a job which called for the processing of a lot of 100 of a certain piece, the standardized operating time allowance on which was 4 pieces per hour. In this shop the working hours were 9 hours on each of the first five working days of the week and 5 hours on Saturdays. Because of definite, posted, written guarantees by the management, the workman knew, according to the 100 per cent time premium plan which had been installed, that:

1. For every hour he actually worked he would be paid his hourly-rate, whether his output surpassed the standard or not.
2. At the end of each job his output would be carefully inspected to determine the quantity of perfect pieces produced, the only item adversely affecting the amount of premium earned being the quantity of imperfect pieces due to defective processing.
3. He would be paid at his hourly-rate for 100 per cent of all time saved over standard time allowed after deducting pieces rejected because of faulty processing.
4. He would be paid for all processed pieces failing to pass inspection due to defective material, for which he could not be held responsible.

On receiving his instructions, time ticket, tools, and materials for the job, he noted that 100 pieces were to be made at a standard allowance of 4 per hour, which meant that if he were to meet the standard he must finish the 100 pieces in 25 hours. Knowing that the working day was 9 hours long, he could easily figure that at the standard rate of 4 per hour, in order to fulfil the requirements he must produce at least 36 pieces a day for two days, and 28 on the third day. He also knew that if he were to earn a premium he must increase his rate of production over the standard, taking care at the same time not to spoil any work, for if he did it would be deducted from his total production, thereby decreasing his opportunities for earning extra money. Encouraged by this incentive his output was as follows:

First day	42 pieces in 9 hours
Second day	44 pieces in 9 hours
Third day	14 pieces in 3 hours
Total production	100 pieces in 21 hours

After inspection the record showed that 95 pieces were accepted, 3 pieces were rejected because of being spoiled in processing, and 2 pieces were rejected because of material defects showing up during processing. In accordance with the company's guarantee he was credited with 95 perfect pieces plus 2 imperfect pieces due to invisible defects in material, or a total of 97 pieces for which he knew he would be paid.

His actual earned time therefore was easily and quickly calculated as follows: pieces to be paid for divided by standard allowed pieces per hour times his hourly-rate; or for that particular job, 97 divided by 4 times \$0.55, or \$13.33. The actual time taken, however, was 21 hours. His standard pay, then, based on his hourly-rate, would have been 21 times \$0.55, or \$11.55. As he actually earned \$13.33 because of "beating time" his premium was \$13.33 minus \$11.55 or \$1.78.

At the end of the first day he counted his pieces produced and found that he had made 42. Having already figured that he must make at least 36 if he were to meet the standard for that day, he knew that if the inspector passed all of the 42 pieces which he had made he would be six ahead of the standard production rate. He would have saved $1\frac{1}{2}$ hours for which he would be paid at his hourly rate, if for some unforeseen reason he did not fall behind in his productive rate or unfortunately spoil a number of pieces before the end of the job.

On the second day he attacked his work with redoubled determination to maintain and if possible increase his lead, and at the end of the day found he had produced 44 more pieces. He saw that he had increased his previous day's lead six pieces by eight more, and was now 14 pieces, or $3\frac{1}{2}$ hours ahead of schedule.

On the third day he went at it again with the knowledge that he had only 14 more pieces to make and 7 hours in which to make them, in order to meet the standard. He did not slow up because he happened to be well within the standard limit, but went at his job with more determination than ever and of his total job of 100 pieces he finished the remaining 14 in 3 hours, or 4 hours ahead of the time limit. He met with a little misfortune, however, as he spoiled 3 pieces and uncovered material defects in 2 others which would necessitate their rejection.

THE WORKER HIMSELF CAN FIGURE HIS WAGES

He knew then that the three pieces he spoiled would be deducted from his total, but the two defective pieces due to faulty material would not be deducted, consequently he knew that if the balance of his output passed inspection he would have 97 to his credit. Knowing that the standard allowed rate of production was 4 pieces per hour, he could readily figure that his earnings

for the job would undoubtedly be 97 divided by 4 times \$0.55, or \$13.33.

He also knew that in 21 hours of actual work he had completed an amount for which the standards allowed 25 hours, and if all pieces had been perfect he would have earned 4 hours premium. But unfortunately he had spoiled 3 pieces for which he would not be paid, as his earnings were based only on accepted output.

On the basis of accepted output he could readily figure that his allowed time for 97 accepted pieces at the standard rate of 4 per hour would be 97 divided by 4, or $24\frac{1}{4}$ hours. But his actual working time had been 21 hours, so he had beaten the standard by $3\frac{1}{4}$ hours and his premium therefore was $3\frac{1}{4}$ times \$0.55, or \$1.78.

Thus we can see the simplicity of the 100 per cent time premium plan of wage payment, its ease of application, its fairness to both employer and employee, the ease and celerity with which it can be understood, and the comparatively few computations required by either the workmen or the few clerks required to handle it. It can also be seen that the incentive or premium earned is an absolutely direct and immediate result of the workman's individual effort, and is directly proportional to his accomplishments.

THE PLAN'S APPLICATION TO GANG EFFORT

That the system is as fully applicable to gang work or effort as it is to individual effort is made evident by the following actual occurrence.

In a certain iron foundry the men were paid a premium of \$0.05 per flask produced over certain quantities and in accordance with different patterns. This had proved unsatisfactory to both the men and the company, the output from week to week being very erratic,

sometimes high, sometimes low, varying largely with the size and shape of the patterns.

According to the plan in force a premium was paid all molders only, who in this case happened to be machine molders. Consequently dissatisfaction was prevalent among cupola men, core-makers, and foundry laborers, because they received the same pay whether for large or small tonnages, while the 11 molders at times received much more than their regular wages.

The records showed weekly tonnages fluctuating from 18 to 41 tons per week with costs per pound varying from \$0.0234 to \$0.0113 respectively. The weekly average over a period of six months was 34 tons per week at an average cost of \$0.0137 per lb.

The foundry operated five full days of $9\frac{1}{2}$ hours each and $5\frac{1}{2}$ hours on Saturdays. On Saturday, however, the tonnage was light, but with nearly the same charging fuel and power costs and loss of iron for a full day, thereby greatly increasing the cost per pound for that day over the normal $9\frac{1}{2}$ hour working days during the balance of the week.

As the output was so erratic as to make very uncertain the meeting of manufacturing schedules in the machine shop, and as the machine shop received its entire supply of castings from this foundry, which was a part of the same concern, a change was necessary.

It was decided, after a conference, to abandon the existing bonus methods, which were based on individual parts or weights produced per day, and to substitute in its stead the 100 per cent time premium plan with weekly-rates based on tonnage produced per week.

An analysis of past performance and maximum daily cupola capacity led to the establishment of a standard rate calling for six tons (12,000 lb.) per day, or 30 tons (60,000 lb.) for a five-day week and 36 tons (72,000 lb.) for a full six-day week, in the latter case Saturday being a full $9\frac{1}{2}$ hour day, the old $5\frac{1}{2}$ hour Saturday

being entirely abandoned. Furthermore, all foundry employees, including the foremen and the superintendent, were placed under the new or "tonnage basis" conditions, thereby reducing the entire situation to a collective and cooperative proposition whereby it automatically caused each man to do his level best or the entire crew suffered.

The following definite stipulation was made and posted conspicuously throughout the factory:

For all weights over 60,000 lb. for a five-day week, or over 72,000 lb. for a six-day week (full 9½ hr. on Saturday) each man will be paid 100 per cent of all time savings brought about by any increase in the tonnage over the standard set, such payment to be based on his hourly rate. Inspection will determine the net quality tonnage for which premium will be paid, and premium earned during any week will be paid on pay day of the next week following.

The actual inspected and accepted tonnage for five days during a certain week was 70,586 lb., which was 10,586 lb. in excess of the standard of 60,000 lb. for five days. This was a direct gain in production of 17.6 per cent over standard requirements. Therefore, since it had been agreed to pay each man 100 per cent of all time savings made, each man's pay for that week, based on his guaranteed hourly-rate, was increased by an amount equal to 17.6 per cent of his weekly normal earnings.

AN APPLICATION OF THE PLAN

For example, a certain workman, whose hourly-rate was \$0.45, worked five full days of 9½ hours each, or a total of 47½ hours. His normal week's pay was therefore, 47½ times \$0.45, or \$21.38; his premium 17.6 per cent times \$21.38, or \$3.76; and his total pay for the week \$21.38 plus \$3.76, or \$25.14.

This method of computing weekly earnings was applied to every foundry employee, foreman, and superintendent included. Analysis of all previous records showed the following:

1. The output of 70,586 lb. for the week in question was the largest five-day record ever made.
2. Only twice had this record been beaten and then by six-day runs in each case.
3. The daily average for the week in question was 14,117 lb., which was a 24.8 per cent increase in production over the daily average of 11,295 lb. for the 26 previous weeks.

The aforementioned method of applying the 100 per cent time premium plan had a great moral effect on all of the employees, spurring everyone to do his best and making the laggards so unpopular that they either automatically fell into line or got out, relinquishing their jobs to men who were willing to work and produce results. Soldiering, carelessness, and absenteeism on the part of any one or several employees adversely affected the quantity of production obtainable and consequently the amount of premium earned. The introduction of the plan has therefore resulted in these three obstructive practices being virtually eliminated from the foundry.

The 100 per cent time premium plan of wage payment has clearly demonstrated practical, meritorious features as follows:

THE ESSENTIAL FEATURES OF THE PLAN

The plan requires no great mental effort on the worker's part to figure his earnings. He does not have to bother with percentages, bonus tables, and formulas which give rise in the average worker's mind to the thought that such mechanisms are simply clever devices evolved by the employer by which unfair advantage can be taken of his limited education, thereby holding back from him a portion of his earnings, rightfully belonging to him by virtue of his efforts,

The net effect of such complexities, although psychological, is powerful and the obvious and natural result is loss of interest on the part of the worker, retardation of production and the engendering in the worker's mind of suspicion and distrust of the management which it becomes almost impossible to eradicate.

In addition to the above advantages, the simplicity with which earnings can be computed makes possible the employment of a fewer number of clerks for operating this system than are required by any other plant which uses time as a basis of computation.

Under the 100 per cent premium plan it is possible to have two workers do a similar operation, under the same standard, with varied earnings, but with similar productive results. This applies especially in the cases where an older employee may receive \$0.70 per hour, while a younger employee may receive but \$0.55 per hour. An employer is entitled to this profit, and it is certainly justice that the older employees receive preference over the younger ones as to amount of hourly-rate, because of their long terms of service, their loyalty to the concern which employs them, their ability to operate most types of machines, and their thorough familiarity with the company's product.

Standards set for the 100 per cent time premium can remain indefinitely without adjustment, at the same time allowing for the fluctuations of the community wage-scale. Standards need adjustment only when the motions of an operation or the methods of processing are changed, due to the introduction of improved machinery or tools, and are so guaranteed in writing.

Fluctuations in the labor market are met by merely changing the basic hourly-rates to meet the revised conditions, and no change whatever is made necessary in the standards, thereby avoiding the usual and serious dangers encountered when rates are cut.

THE PLAN BEGETS CONFIDENCE

The worker is guaranteed a definite hourly-rate and a definite day's earnings based on working a normal full working day at his hourly-rate. This is very important to learners, as it prevents them from becoming discouraged when they fail to meet or surpass the standards. In addition, the worker is paid his hourly-rate for all time saved above the fair and equitable standard which must always be set as the result of careful time study and operation analysis, taking into consideration all influencing factors. Thus confidence is inspired in the worker, and the greater interest and conscientious effort put forth by him to attain and surpass the standards set naturally result in increased wages, lower costs, and greater profits.

The plan holds back a worker for only one reason, namely, lack of quality production, and this is the only justifiable reason why any worker operating under an incentive or any other plan should be held back. With correctly set standards there is no reason why a worker should not be allowed to produce to the limit of his ability; for the more good pieces he produces in a given time period and the more he earns, the less the cost of the product and the greater the profit to the company.

Any steps taken by the management to prevent the worker from producing more work and therefore earning more money are like'y to have an immediate and disastrous effect. Such tactics will absolutely defeat the main objects of the incentive plan as set forth above, and will produce the same dangerous results as would occur if the standards were flagrantly and unjustifiably cut for the sole reason of preventing the worker from earning what might be thought to be "too much money."

Under the 100 per cent premium plan no arbitrary monetary penalty is levied against a workman who fails to reach any given standard of performance which has

been set. Such a penalty, by virtue of its inherent unfairness, serves only to kill the workman's initiative and desire to strive for greater efficiency. Furthermore, such a penalty as just mentioned invariably reacts on the beginner, who would naturally be the first one to fail to reach a given standard. The only penalty, if it can be properly called such, is that the premium paid is based solely upon the number of perfect pieces produced which pass inspection.

EACH JOB BASED UPON ITS OWN MERITS

The plan deals with the worker's individual accomplishment on each job to which he may be assigned. Such a job is considered as a unit with no relation to any other preceding or succeeding jobs he may be on, and if he earns a premium on one job, he is paid this premium—if he fails to earn a premium on his next job he is paid at his guaranteed rate for the actual hours he worked. Therefore it is evident that if a worker were to be employed on, say, seven different jobs during three normal working days and surpassed the standards set on only three of the seven jobs, he should naturally be paid a premium on the jobs on which he surpassed the standard, while on the others he naturally should receive no premium.

Any averaging of the worker's efficiency over a given period and the paying of premium according to whether this average exceeded the standard or not would be essentially unfair and unjust. The failure to make a premium on certain jobs might pull a worker's average down so low as to nullify the premium made on certain other jobs, thereby preventing him from receiving what was rightfully due him as the result of his efforts. Thus he would be penalized for something for which he might not be at all to blame, namely, an incorrectly set standard or an inherent lack of aptitude for some particular job or jobs.

The plan is just and moral because it violates no right or obligation; it gives to every man exactly his due; it is equitable in action and judgment; it conforms to and is grounded in reason; it is essentially fair and impartial; it is characterized by practical excellence; and it conforms strictly to one's natural sense of what is right and proper.

CASES WHERE WORKERS FAIL TO EARN PREMIUM

In the event a workman consistently fails to reach a standard which has been fairly and equitably set, it is well to realize that in all probability he is not fitted for the particular work he is doing. In all fairness to both employer and employee he should be transferred to other work, until he is fitted into his proper niche, which a little patience and fair dealing almost invariably finds for him.

Cases will be encountered where an employee is naturally perverse, unreasonably stubborn, and simply will not try to attain a standard. Such a man is not thinking in the right direction, and harsh treatment and penalties make no impression upon him other than to increase his stubbornness and fan his antagonism to a greater heat. Often such a case can be cured by talking to the man quietly and sensibly, explaining and demonstrating matters simply and logically, appealing to the man's pride in his own personal welfare and that of his dependents, and showing him wherein he has an incorrect understanding of the entire situation.

Very few employees will fail to respond to such a course of treatment. When their thoughts are guided into the right channels, they ordinarily see their mistakes, although not always willing to admit them in so many words. They nevertheless show their appreciation and their new understanding of matters by conscientiously applying themselves, and sooner or later

they actually reach and often surpass the standards for which they originally held such an antipathy.

Outside of the kind of employee just mentioned, employees ordinarily fail to earn premium either because of the standards improperly set, or the worker not adapted to the task, or possibly both.

In the first case it means a careful and thorough re-study of the operation or operations to determine wherein the existing standard is in error, and if it is in error their immediate correction, thereby insuring a fair and equitable standard in all respects.

In the second case it becomes a matter of endeavoring to place the worker on work to which he is better adapted and for which he has the greatest possible aptitude. This requires patience and the proper recognition of the human factor, for in many cases a worker who is a hopeless failure on one class of work is found to be an exceptionally efficient producer on another.

These characteristics have caused the plan to succeed and accomplish its purposes wherever installed.

The incentive held out to the workers makes possible a high rate of efficiency, maximum quality production per man, greatly decreased costs, and increased profits.

A "CREDIT POINT BONUS CONTEST" PLAN¹

This article deals with a new idea in industrial management, which is in successful operation at the plant of the Dittmer Gear & Manufacturing Corporation, Lockport, N.Y. This company has instituted what is known as a "credit point bonus contest," which is closely identified with its regular bonus system. Before describing the credit point system, an idea will be given of the regular bonus system used.

¹ By A. H. Dittmer, President Dittmer Gear & Manufacturing Corporation, Lockport, New York. *Machinery*. 27 : 549-51. February, 1921.

EFFICIENCY PERCENTAGES FOR DETERMINING THE
AMOUNT OF BONUS

When a man is hired, he is given a flat hourly-rate, and he receives this rate as long as he remains on work which is not classified under the bonus system. As soon as he has been put on a job that requires him to work under the bonus system, he is given an opportunity to fix a standard that will represent the amount of work that he should do in a given length of time working at a normal speed and under average conditions. The standard which he thus establishes, working to a stop watch, is accepted by the company as a 100 per cent efficiency mark. As long as the operator can produce 67 per cent of this established standard, he is paid his regular flat rate, but his 67 per cent is a low average for a workman to maintain, for a man whose production drops 33 per cent as compared with what he is able to do under normal conditions is not the kind of man that an efficient organization is desirous of keeping on its payroll, unless there is a good excuse for such a drop.

Starting with the low limit of 67 per cent of the established hourly standard, a chart has been prepared in which all the efficiency percentages up to 180 per cent are listed, and arbitrary bonus percentages given for each efficiency percentage, so that the amount to be added to the man's flat hourly-rate can be readily calculated. There is no bonus for 67 per cent efficiency; for 70 per cent efficiency, there is a 1 per cent bonus; for 75 per cent efficiency, 3 per cent; for 80 per cent efficiency, 5 per cent; for 90 per cent efficiency, 10 per cent; for 100 per cent efficiency, 25 per cent; and for each per cent increase above 100 per cent an additional 1 per cent in the bonus rate is made. This brings the bonus rating for the maximum efficiency of 180 per cent, provided for on the chart, up to 25 + 80 or 105 per cent.

Perhaps the method by which the bonus is figured will be better understood by taking a concrete example.

Dittmer Gear & Manufacturing Corporation

BONUS RECORD

Employee Harrington, D Clock No. 56 Week Ending Sept 21 1920

DATE	PART NO.	OPERATION NO.	PIECES FINISHED	TIME ACTUAL	STAND. HRS.	% EFFY.	BONUS PERIOD TIME EARNINGS	BONUS RATE	BONUS EARNINGS	PRO RATA TO COSTS
9/15	121	50	90	7.00	5.00		3.00			0.99
	12	56A	15	1.25	0.68		0.62			0.20
16	"	"	17	3.50	3.30		1.75			0.58
17	"	66B	25	4.00	3.57		1.00			0.33
	"	66A	28	4.00	4.66		1.00			0.33
18	"	"	29	4.25	4.83		1.00			0.33
	"	66B	34	4.25	4.85		1.13			0.37
20	"	"	76	9.00	10.85		2.25			0.74
	"	66A	70	9.00	11.66		2.25			0.74
21	"	66B	58	8.00	8.40		2.00			0.66
	"	66A	70	9.00	10.66		2.50			0.83
				63.25	68.66	108	18.50	33	6.10	6.10

* Total Earnings during Bonus Period

Machinery

FIG. 1. RECORD SHEET ON WHICH WEEKLY EARNINGS ARE KEPT AND THE EFFICIENCY PERCENTAGE ENTERED

The record of the earnings of each man working under the bonus system is kept on bonus record charts such as illustrated in Fig. 1. It will be seen that in this case the operator worked on a number of different operations during the week, and that in establishing the efficiency percentage, the total week's work is considered. Referring to the fourth item on this record, it will be seen that operation 66B was performed on twenty-five pieces in four hours' time. The standard established for this particular operation is seven pieces per hour, so by dividing the number of pieces of work by this standard, the number of standard hours 3.57 is obtained. This is slightly below 100 per cent efficiency as can be readily seen, but in the case of the second item the efficiency percentage is dangerously low. However, by considering the totals for the week it is seen that in 63.25 hours, the work of 68.66 standard hours was accomplished. Dividing the number of standard hours by the actual number of hours consumed, gives the efficiency percentage of 108 for the week.

Now by referring to the chart of bonus percentages for various efficiency rates, the payroll department will be able to see at a glance that an efficiency rating of 108 per cent represents a 33 per cent bonus rating. That is, 33 per cent of the man's flat-rate earnings for the period that he has worked under the bonus system or, in this case \$18.50, represents the bonus earnings during that period of time. In this case the bonus earnings are \$6.10, which is in addition to his regular flat-wage. In the column at the extreme right, the extra costs above the regular flat-rate are prorated for each operation, so that the cost accounts may be correspondingly corrected; 33 per cent of the time earnings for the bonus period for each job gives this amount, which is added to the cost of each job.

It is not intended to reestablish standards for different operators. Most jobs have previously been rated, and this standard must be the one used for all operators,

regardless of their flat wage-rate. If in the case of a job on which no standard has been set, a man is timed and produces twelve pieces per hour, this is considered the hourly standard; to obtain the standard hours, the total number of pieces produced in any lot is divided by this standard per hour. For example, if there are 720 pieces in a job and a man in establishing the rate, machines 12 pieces an hour, then the standard hours for the operation is 60. By dividing the standard hours by the actual number of hours required to do the work, which in this case we may assume to be 48, the per cent of efficiency is found to be 125. It was previously stated that 100 per cent efficiency yields 25 per cent of a man's rating as a bonus, and that for every per cent rise in efficiency a 1 per cent increase in bonus is made, so that in the example cited, 125 per cent efficiency represents a bonus of 50 per cent.

SPECIAL BONUS PROVISION FOR SET-UP MEN

Obviously the bonus system for the machine operators cannot influence the earnings of the set-up men, and also has no connection with the work of other non-producers such as inspectors. In order to create an efficient organization, such non-producers must be taken care of in the credit point bonus system, which is to be described later, and so special means are employed to enable these men to receive similar benefits to those paid the machine operators. The inspectors share in the benefits of the credit point bonus contest through their endeavors in maintaining high-grade shipments, as will be referred to later. In the case of set-up men, the following special bonus system applies. Each set-up man has a group of machines under his personal supervision; if these machines run without loss of time for a week, the set-up man is credited with 100 per cent efficiency, and from this credit, lost time caused by machine repairs, absent operators, etc., is deducted. The set-up man is also credited with 100 per cent efficiency if the operators on

all the machines under his supervision make an efficiency rating of 100 per cent.

Both of these efficiency percentages are scaled down to 80 per cent, that is, if the set-up man registers 80 per cent on both these items he is paid his flat hourly-rate. For each additional per cent over 80 for each of these items, he is entitled to $\frac{1}{2}$ per cent of his rate as a bonus, so that if the set-up man registers 100 per cent for the week in both items, he receives a 20 per cent bonus. These bonus earnings are recorded weekly in a similar manner to the earnings of the regular productive man.

REJECTED AND SCRAPPED MATERIAL

It would, of course, be unreasonable to pay bonuses for rejected work; therefore, fair reductions must be made so that the company will not have to pay for work which is not properly machined. When it is necessary to make such a deduction in a man's earnings, the slip shown in Fig. 2 is made out in triplicate by the inspector, and one of these copies goes to the payroll attached to the bonus record, Fig. 1. The second copy is handed directly to the operator so that he may know before pay day all details in regard to the reason for making deductions. The third copy is retained by the inspector for future reference. After the proper deductions have been made in the payroll department, the bonus record with the deduction notice attached, is placed in the workman's pay envelope so that he can check up his entire bonus earnings without being obliged to ask for explanations from the clerical department.

THE CREDIT POINT BONUS CONTEST AND ITS CONDITIONS

Having described in detail the bonus system used in connection with the credit point bonus contest, the method of making awards under this scheme will be better understood. The contest was originally intended

to run for a period of six months, but it is planned to renew the contest as soon as the present period has expired. In this way the contest constitutes an additional bonus system which takes into consideration not only the production end of the industry, but also all other factors which by special effort will add to the efficiency of the organization. A committee of men from the shop was selected for the purpose of conferring with the management in regard to improving the contest from time to time, for it was realized that such improvements would be necessary as the results of the contest became more in evidence. The general purpose of the contest is "to reward employees for initiative, loyalty, efficiency, and regularity, and to increase the efficiency of the plant in general."

DGMC-90-9-11-1000

Deduction Notice for Material Improperly Machined

Date _____

Operators
Name _____ Clock _____

We have deducted the following pieces from your production of _____ No. _____

Quantity	Symbol	Operation	Remarks

FOREMAN
INSPECTOR

Fig. 2. Record Form on which Deductions for Poorly Machined Work Are Entered.

The contest is a means by which additional awards may be earned for various things such as attendance, efficiency, etc. The basis by which the awards are made is by points, each point representing an award of 5 cents. Besides the various factors which are subject to awards under this contest, provision is made for paying special awards for ideas suggested which will benefit the organization. All employees with the exception of the executives, are eligible to partake in this contest. The same amount, 5 cents, is used when penalizing the men for breach of established rules and regulations of the company, as is awarded for meritorious service or evidence of cooperation and loyalty to the concern. The following classification of subjects to receive the attention of the management in conducting this contest has been made:

1. Perfect attendance. When no time has been lost through absence or tardiness for one month, 40 points; two months, 50 points; three months, 60 points. For each additional month, 5 points are added until 80 points per month are reached, which is the maximum monthly award for attendance. Exceptions are made in case of sickness, death, or other serious matters, provided the management is notified to that effect.

2. One hundred per cent efficiency in production. First week, 5 points; second week, 10 points; third week, 15 points; each following week 20 additional points. To be eligible for awards for efficiency, the employee must have registered at least 35 bonus hours per week; that is, it is necessary for an employee to actually work 35 hours each week on bonus work in order to become eligible for awards, regardless of the bonus per cent that the man may have registered.

3. Continuous service (not being removed from the payroll for any reason). Such service receives awards regardless of the attendance record. For three month's continuous service, 20 points; for six months' service,

25 points; for nine month's service, 30 points; and for each additional six month's service, 70 points.

4. Suggestions submitted and accepted. No award is made of less than 10 points, and no award is paid for suggested plans of improvements already under consideration by the management. The awards are based on the value of the suggestion, and may be increased as the suggestion becomes of greater value to the company.

5. Rate of scrap as determined by material and labor losses. The determination of the rate of scrap is made near the termination of the contest, and awards are made as follows: 1 per cent or less, 100 points; 1 per cent to 2 per cent, 75 points; 2 per cent to 3 per cent, 50 points; 3 per cent to 4 per cent, 25 points; above 4 per cent no award. These awards are paid to every person in the plant. Employees not having served through the entire bonus period benefit proportionally to their length of service.

6. Maintenance of high-grade shipments. These awards are made to inspectors only. For 100 per cent shipments, 25 points; for 1 or 2 per cent rejections the award is determined by the money value of the rejected work.

7. Gold medal or honor productive man (man having highest record for efficiency in production during a month), 25 points; gold medal or honor non-productive man (set-up man having highest efficiency percentage, and inspector having highest efficiency for monthly shipments), 25 points. Non-productive men such as inspectors, set-up men, etc., obviously do not have as good an opportunity of registering large numbers of bonus points as do the productive men, and for that reason each class is given a like consideration in making gold medal awards. This same policy is followed in every case where prizes are involved. There is an honor roll maintained in connection with the credit

point bonus contest which is posted every week, giving the time-clock numbers of all men who have registered an efficiency percentage of 100 or better. It is the average taken from these weekly honor rolls that determines the awarding of gold medal prizes”

8. Miscellaneous credits and penalties subject to the special attention of the management. (a) Clean and orderly machines, desks, benches, etc., penalty or award 5 to 15 points; (b) clean and orderly condition of floor around machines, desks, etc., penalty or award 5 to 15 points; (c) carelessness in handling blueprints, penalty 25 to 50 points; (d) failure to use the provisions made for handling work, penalty 5 to 15 points; (e) smoking inside the shop or mutilating bulletins or notices, penalty discharge and loss of all points; (f) carelessness in handling materials, penalty 5 to 15 points; (g) promptness in making out reports and for being up to date in work, award or penalty 5 to 25 points; (h) failure to turn in gages between day and night shifts, penalty 5 to 15 points.

ADDITIONAL FACTS REGARDING THE CONTEST

In addition to the foregoing eight classifications, special prizes are awarded to those registering the highest net number of credit points during the period of the contest. Three of these prizes are for producers and three for non-producers, and the management has reserved the right to name the amount of these awards, so that the awards may be made in proportion to the amount of profit realized by the company during the period of the contest. Such things as committee work, athletic showing, handling and returning of tools, etc., are especially awarded or penalized, and also such things as department efficiency, department attendance, etc.

While this system should work out to the decided advantage of the employee as well as the employer, a

strict discipline must also be maintained. No cheating or evasion of duty, if discovered, will escape being penalized, and second offences result in discharge. Payment of credits and special prizes is made immediately after the close of the contest.

In the case of a break occurring in a man's attendance record, efficiency rating, or any other feature of the contest, whereby from consecutive records cumulative awards accrue, the minimum point toward them becomes the starting point for all additional awards. In general, where penalties are inflicted for breach of rules, the matter is handled in such a way as not to inflict undue hardship, and in most cases warnings are given before penalties are inflicted. These conditions, of course, are brought to the attention of the management and they are dealt with as the severity of the case warrants.

EFFECT OF CONTEST ON THE APPEARANCE OF THE SHOP

The impressive thing about this contest is that it works, and the results are evidence that it has gone a long way toward bringing about the object for which it was designed. The interior of the shop presents an exceptionally attractive appearance and there is a noticeable freedom from congestion. The thought is evidently uppermost in each man's mind that a contest is in operation and that they are all after the big awards. Then as constant reminders, a number of notices are hung from the walls which read "Let's Keep Her Neat and Clean," referring, of course, to the machine and its environment. Whenever any complimentary correspondence is received from a customer commenting on the quality of the work produced or the promptness of shipment, or any other similar matter, the substance of such communications is made known to the men in the shop, if in the judgment of the management such a step will serve to encourage the men and enlist their cooperation.

“MAXI-PAY BONUS PLAN” OF BULLARD
MACHINE TOOL CO., BRIDGEPORT,
CONNECTICUT¹

The plan of the Bullard Machine Tool Co., Bridgeport, Conn. in building up its organization successfully, rests on the principles which have been summed up as follows:

Respect and confidence between employer and employee must be established and maintained.

A proper and equitable incentive must be provided for both.

There must be established a measure for determining the rate of wage.

The rate of wage must be definitely related to the energy, skill, experience and knowledge required to perform the work.

The company tells the men frankly that its incentive lies in the demand for its products and the profit which this brings.

This means, of course, that manufacturing costs must be kept down and that manufacturing methods be efficient. For the worker who is employed directly on production, the incentive is divided into three separate and distinct units.

The basis is an hourly-rate of wage, bearing an equitable relation to the energy, skill and knowledge of the individual, as well as to the cost of living. There is also an incentive to prompt, regular, and continued attendance, for only in this way can both sides reap the full benefit of employment. Idle machines not only fail to earn money but are an expense to the company. This ly earnings, and has proved remarkably attractive in every way.

¹ By Fred H. Colvin, Editor, American Machinist. American Machinist 52 : 1137-9. May 27, 1920.

THE MAXI-PAY BONUS PLAN

It is further recognized that the close application to work with an accompanying increase of skill, and, more than this, the *desire to produce*, merits an additional reward commensurate with the increased output obtained. This is taken care of by what is known as the Bullard maxi-pay production bonus plan, which is based upon the allotment of an established standard time for unit production. This plan provides for the payment of an increasing bonus without limit, for increased efficiency and reduction of time required for the actual performance of the work in hand. The inefficient worker, whether the inefficiency be due to his lack of effort or lack of ability, loses nothing except the opportunity for increased earnings, advancement and retention, as his established hourly-rate is paid without regard to his calculated efficiency.

This plan has proved extremely attractive to the workers and has been highly satisfactory to the management. By it, the worker is financially rewarded for the extra effort and skill required in increasing production, and the management obtains an increased productive capacity from the same plant and equipment, which, of course, means an increased return on its investment.

The hourly-wage-rate is based upon individual productive capacity, the cost of living, and the question of supply and demand. Individual productive capacity bears a paramount relation to the other factors; it directly affects the cost of manufacture and therefore the salability of the product in question. To arrive at an intelligent conclusion by combining these factors requires experience, judgment, and, above all, a fair and equitable mind. Needless to say, this is the crux of the whole situation, and on it the success or failure of such a plan depends. It must be remembered, however, that the

hourly-rate must be sufficiently high to insure a contented state of mind in the worker.

WHERE CONFIDENCE COUNTS

Critics will immediately point out instances where what seemed to be very liberal bonus plans failed to insure harmony and continued production. Strikes and lockouts have resulted under what appeared to be liberal bonus plans and profit-sharing methods. If, then, these plans succeed in some places and fail in others, we can only draw the conclusion that the success or failure must depend to a considerable extent *on the way in which they are applied* and on the personal element to a very large extent. When any method of management succeeds in the face of difficulties and disturbances in adjoining plants, there can be no question as to the management having established confidence of a square deal in the minds of its men. And this cannot be done by proclamation; it must be the result of actual practice.

SETTING FAIR STANDARD TIMES

This plan necessitates the setting of standard-rates of efficiency which are a direct reflection of the energy, skill, experience and knowledge of the worker, by which each can be judged and from which promotions can be made. Here is where the principle of the square deal plays a very important part. No individual's judgment is infallible, and no hard and fast rules can be entirely successful in preserving harmony and good feeling. Men of exceptional experience and character are detailed for the work of setting standard time, this being just the reverse of some former practices, where young and inexperienced college men were chosen for this work.

The management realizes that it is practically impossible for any man, no matter how broad his experience, to figure accurately and equitably in every instance—particularly on complicated work. It is therefore the

policy of the company to put new work, or old work with new equipment, into operation on the basis of a trial time. In this connection it is thoroughly understood that the management relies upon the operator to put forth his best effort and to be absolutely on the level. Knowing that the management plays fair with him, the workman responds in practically every instance, and it is the exceptional case where any attempt to influence time setting by soldiering has been attempted.

Knowing that it is out of the question to expect perfection in time setting or anything else, means are provided for making special adjustments which may be found necessary. Conditions occasionally develop which are entirely beyond the control of the operator or the time setter, such as exceptionally hard castings, a run of castings or other material which must be rejected for defects which appear only after machining, and sundry other causes. On the other hand, the confidence that a square deal is always forthcoming makes it possible to adjust standard times downward as well as upward when equity demands.

EFFICIENCY OF THE AVERAGE MAN

The system of figuring time assumes that the average man on a work-day basis, and with average application, will be 75 per cent efficient, while a high-grade man, under the same conditions, will produce approximately 100 per cent. This enables the average man to earn the hourly-rate of the class to which he belongs, and for every 1 per cent he increases his efficiency over 75 per cent he obtains a similar increase in wages. Thus, the 100 per cent man gets 25 per cent bonus on his wages, this bonus being paid monthly.

There are two exceptionally good features about the whole plan, especially about the way in which it has worked. It has helped to make men contented when all of the rest of the city was in more or less turmoil, and

it has increased production and reduced the cost of manufacture in a manner which is extremely gratifying to the management. The figures are almost unbelievable and would make many shop managers green with envy.

The average man or the man with 75 per cent efficiency must maintain this in order to be considered a desirable addition to the working force. For promotion from this class to the one higher, he must attain an average efficiency of 90 per cent for three months. An average efficiency of 100 per cent places the worker in the highest class, which, of course, carries the highest hourly-rate. In order to maintain standing, the workman must keep his average performance up to the percentage of efficiency, required for that class, demotion after a reasonable period being the very natural penalty. By this method both promotion and demotion are automatically controlled by the individual's efficiency record and not by the whim of any individual.

Subforemen, leaders in charge of working gangs of mechanics on repair and similar work, are in a separate class, and are rated at a somewhat higher figure than the 100 per cent workers. This group is made up of men with wide experience and employees of long standing, and from them, foremen and shop executives, so far as possible, are selected.

BONUS PLANS FOR TRUCK DRIVERS¹

NOTE—The following article on "Bonus Plans for Truck Drivers" does not confine itself entirely to the subject of Production Bonus Systems, but is given here because of its completeness.—*Editor*.

FOUR TYPES OF BONUSES

Truck bonus plans divide themselves naturally into four classes, according to the results which each is designed to accomplish.

¹ By Harold P. Gould, Chairman, Truck Owners Conference, Chicago. 100%. p. 123-8. June, 1919. p. 121-32. July, 1919.

First and most complete is the combined production and economy bonus (B1) either in the payment of cash, or the issuance of credit rating.

The second class (B2) is the production bonus. Subdividing our examples according to methods of payment, we find one by commission, two by piece-work, three by bonus for exceeding a standard, either an individual or a pooled bonus.

The third class (B3) includes economy bonus plans for the following or similar purposes:

1. Lowering per mile cost
2. Increasing tire mileage
3. Decreasing spring breakage
4. Decreasing accidents
5. Increasing gasoline mileage
6. Good behavior
7. Regular attendance
8. Not getting stuck on the road
9. Keeping the car out of the repair shop.

The fourth class (B4) comprises service bonus plans:

1. Yearly bonuses, distributed at Christmas time, or bonuses at other infrequent intervals
2. Yearly distribution plus a saving feature
3. Regular wages rising \$1 per week each month for period of months.

While these four divisions do not cover all possible bonus plans for truck operation, they do cover all those studied or discovered by this organization. We believe that their classification, and similar classification of additional plans as they are discovered will simplify greatly the study of truck bonus plans as a whole, and allow better choice on the part of the prospective user of that plan or several plans that can be worked into his business to the best advantage.

THE FIRST BONUS PLAN

The first bonus plan of which we have any record is the bonus which the Western Fuel Company of Chicago

paid C. E. Timroth, President of the Timroth Motor Trucking Company, in 1899 twenty years ago.

Mr. Timroth drove three horses hauling coal to the County Hospital for \$21 a week, with a basic-wage for a certain number of tons and 20 cents a ton for every ton hauled above that number. He hauled an average of 42 tons a day for a solid year, and averaged between \$155 and \$160 a month.

B1—COMBINED PRODUCTION AND ECONOMY BONUS

The Timken-Detroit Axle Company of Detroit have worked out what is perhaps the most complete combined production and economy bonus in use in the country to-day, because it is based upon the savings in cost per ton-mile.

George W. Veale, Director of the Department of Standards of this company, after a thorough study of the cost records of the Timken Company, established an average cost per ton mile as a standard, finally determined at 8 cents per ton mile.

Half of the saving under 8 cents per ton mile, it was agreed was to go to the Timken Company and half to the driver and dispatcher, in the proportion of 40 per cent of the saving to the driver and 10 per cent to the dispatcher or garage foreman.

Covering a period of fifteen months' operation, this bonus accomplished remarkable results including, in the case of the best truck, No. 3, a ton mile gain of 99.9 per cent with a cost per ton mile decrease of 64.7 per cent—a truly remarkable saving.

Truck No. 2 increased its ton mileage 104 per cent with a saving in cost of 43.3 per cent. In the whole fleet the ton mile increase was 70 per cent in August 1917, with 30 per cent more capacity of trucks than in June 1916.

The average per cent of operating time for a single month has reached the maximum figure of 77.3 per cent

counting as idle time all time when the truck is not actually carrying a load; thus idle time includes all the time the truck is out of service and all the time lost for loading and unloading.

The bonus is payable semi-annually as the heavy expense in the second or third month may wipe out some of the saving accruing to the driver's bonus in the first month.

The careful check-up on cost necessitated by having to give the drivers a square deal in the fair distribution of the bonus, the incentive given the drivers to load and get-away more promptly which increases ton mileage and lowers cost, in addition to opportunity given the management to distribute the praise for lower cost where the credit is really due, and to pick and standardize upon the individual truck units which are best adapted to Timken service, have all been additional factors in the great success of this plan.

THE CREDIT SYSTEM

Harold B. Weaver, while Chief Engineer of the Chicago Motor Bus Company, installed what is known as the credit system a most complete merit and demerit system for increasing the hourly-rate of pay of the three hundred and sixty-five employees of that Company, in addition granting them an interest in the profits of the business after they have been awarded a certain number of bonus credits.

Twenty-five credits are granted for each month of satisfactory service with the company, and after the earning of one hundred and fifty credits, or six months' regular service, the employee is entitled to a cent an hour increase in pay.

Extra bonus credits are granted on the judgment of a committee and the management, for particularly good service, or efficient work, which brings the date of the raise in pay in less than six months.

The book of rules, containing a schedule of the

demerits which are the penalty for their infraction, is printed and distributed to each man.

Such demerits detract from the credits of a man and defer the time of the cent an hour raise in pay. In other words, the automatic increase in pay is determined solely by each man's merits and demerits record.

The records of all the men are posted on a bulletin board near the recreation room where all may read them. Not only does each man know exactly where he stands in relation to every other man in the company, but the management can tell at a glance just which men are progressing the fastest, which ones have been longest in the employ of the company, and which have the fewest demerits for breaking rules.

This is the combined bonus, on the basis of merits, for both length of service and quality of service, as well as for both production and economy.

In order that there may be no unfairness in the imposition of discounts, a written definition of an offense is made out and if the man wishes to appeal the decision, the case is settled by the superintendent or is referred to a Board of Appeals, made up of three men who have had nothing to do with the happenings in question.

The credit system allows the use of bonus credits for group or pool action. For instance, this company gave the whole organization, down to the last man in the shop, credit for every fiftieth of a mile they went up per gallon of gas in the operation of their sixty-five busses on the Chicago highway. They went up 3 cents to the mile. The cost monthly in payroll was \$300, and the saving in gasoline \$1200, making a net earning to the company of \$900—which is good business.

In the same way the company gave the whole organization bonus credits for a reduction of accidents on a mileage basis.

One of the big advantages to the company is the fair-

ness with which all the men are treated and the reduction of turnover due to each man's certain knowledge that he will receive increased pay, if he performs continuous and faithful service.

The profit-sharing plan comes into effect after a man has fifteen hundred credits, which may take from two to five years, depending upon the man's ability and faithfulness. When he participates in the earnings of the company he does so at the same dividend rate earned by the common stock, his yearly salary being used as the basis of figuring his dividend.

BONUS BASED ON MILES TRAVELED, WITH GAS CONSUMPTION PROVISION

The DeFrain Sand Company of Philadelphia based its bonus first on the percentage of actual operating time shown on recording device charts, to the standard or allowed time of six minutes per mile, with ten minutes allowed on each trip for loading and unloading.

For instance, if the time taken per mile is six and one-half minutes in any week, the driver is considered to have made 92 per cent efficiency, found by dividing the standard time six minutes by the actual time six and one-half minutes.

To prevent waste of gasoline in the effort to earn the mileage bonus, the company added a close check on mileage per gallon. The standard miles per gallon was taken as five, and if the actual miles per gallon in the week taken above was five and five tenths miles the driver was considered as 110 per cent efficient in gasoline consumption.

The average efficiency, or half the two figures, in the example above, $92 \div 110$, in this case would be 101 per cent.

A bonus of \$2 per week was paid to every driver with 80 per cent to 90 per cent efficiency, \$3 per week

to every one with 90 per cent to 100 per cent, and \$4 per week to each one showing over 100 per cent, as in the example we have taken.

Production is paid for in miles in this case, but not in tonnage hauled, which leaves this plan open to the criticism that it pays the driver better to get away promptly and run at low gas consumption, than to do profitable work for the owner by carrying a full load every time.

Some offset of this kind seems necessary to insure economy when production increases are paid for with a bonus, or to insure production increases when economy is paid for with a bonus.

The examples of combined production and economy bonus given here seem to accomplish this dual purpose pretty well, although executive supervision and care will provide the necessary check in most cases when simple production or economy bonuses are used.

B2—THE PRODUCTION BONUS

Production bonuses may be subdivided under the following heads:

1. Commission
2. Piece-work
3. Bonus for exceeding standard task
 - (a) Individual
 - (b) Pooled

Straight production bonuses to increase the amount produced over the standard task are more common than any other type of bonus plans. That hardly any two of those discovered are alike in many particulars, shows the various applications possible with this type of bonus, but almost every one of them is successful in doing what it set out to accomplish.

STRAIGHT COMMISSION BONUS

The General Storage & Cartage Company of Detroit pay their truck drivers a straight commission of 20 per

cent on the earnings of the truck, which has put every driver into business for himself.

This carries out the simple principle upon which salesmen and various other workers whose efforts directly affect the production of the business are paid, but it is the only thoroughly worked out commission plan of truck driver payment we can find in this country.

The average earning per truck per day is \$35; subtracting \$7 salary, this leaves \$28 net per truck per day for an average load capacity of five tons. One truck earns as high as \$63 in a single day, which nets that driver \$12.60 and leaves the company \$50.40 for expenses and profits.

Only 10 per cent of the total income on the truck is really paid as a bonus because half the average sum, or \$3.50 per day, would be the union scale paid the drivers anyway, regardless of production. The guaranteed day-rate of \$4 a day is assured every driver in case his commission does not run over that sum.

The bonus has been responsible for a 50 per cent increase in earnings, however, which shows how profitable an investment this is for the company.

This plan cuts waiting time down absolutely to the minimum because the drivers earn twice as much when they are running as they do when the truck is standing idle waiting for loading or unloading.

They devise new loading methods and even convince customers to put in loading aids without expense to the cartage company. Also they are keen to keep the trucks out of the repair shop.

The plan has done away with the shortage of labor. In fact, the company has a waiting list of drivers. Higher pay and satisfied drivers mean, of course, better service to the customer and increased business to the company.

The commission plan or piece-work plan has been extended to the loaders and unloaders in the warehouse, for taking news print paper out of the car and rolling it into the warehouse; they are paid 13 cents a ton for

unloading the rolls, and receive 10 cents for taking them out of the warehouse and loading them on the truck.

Another immediate effect upon the drivers was to make them desirous to carry trailers, in order to increase their tonnage and commission.

A more complete discussion of this General Storage and Cartage Company bonus plan has appeared in 100% Motor Truck Section.

COMMISSION BASIS AND PROFIT-SHARING

The Yellow Cab Company of Chicago pay their cab drivers on a commission basis, supplemented by a form of profit-sharing.

Their drivers now receive 23 per cent of all fares brought in through regular orders to the company, 18 per cent of fares on pickups, and 50 per cent of extra fares.

Economy of gas consumption is assured by allowing the drivers to buy their own gas from the company at 11 cents per gallon, practically half price, at the same time that a commission on the earnings is allowed.

The corporation of its own free will determined to give its employees 35 per cent of its profits in the form of semi-annual dividends and bonuses, to be distributed according to three classifications of the employees, classes A, B, and C, as determined by merits and demerits awarded according to the quality of service they render.

Cash dividends prorated according to total earnings, the percentages being established by the class, are given to all those in service for five out of the six months dividend period.

Each month an amount of common stock equal to 10 per cent of an employee's commission or salary is set aside, but a stock certificate is issued to each man for a smaller percentage than this amount determined by his class, while the remainder of the 10 per cent in each case goes into a war bonus fund.

The certificates are translatable into stock at the end of each dividend period.

The war bonus fund is divided at the end of each dividend period among the three classes in proportion to their respective holdings of certificates.

There are excellent provisions for greater reward for continuous service, for the award of extra merits, for the fair handling of demerits, which are too long to be given in full.

A TRAILER BONUS

The Dunbar Stone Company, River Rouge, Michigan, has a simple trailer bonus plan. Every time a driver takes out a trailer he gets a brass check; he accumulates these until pay day, when he turns them in and gets a stipulated amount of money for each in addition to his regular wages.

All men do not like to carry a trailer because it is a little more trouble, so that all who do get so much per hour extra all through the month, in addition to the bonus. They are considered in a class a little above the regular truck drivers, for they carry a helper while the others do not.

THE EMERSON BONUS

Joseph T. Ryerson & Son, steel warehouse organization, pay their loading gang on the Emerson bonus curve for meeting standard time in loading their trucks; the result was that loading time was cut within the first three months' operation of the bonus from one hour to one-half hour per load.

On two trips per day for twenty-five trucks this would average twenty-five trucking hours saving, or something like \$60 to \$75 a day money saving to the company.

The earnings of the men and their standings in comparison to their fellow workers are posted on a black-board where all the men can read it. The bonus is figured daily, itemized in clear monthly statements to each man so that he can figure out just what his earnings

have been each day and be sure that no mistakes have been made in the office.

If trucks cost from \$2 to \$3 per hour, the institution of a bonus plan which will save one hour a day is a worth-while investment of time and money for the concern seeking maximum results.

BONUS FOR FREIGHT HAULING

The Michigan Drug Company of Detroit at one time hired its freight hauled to and from the freight depots by outside haulage companies, while it employed its own ten trucks on city delivery. As the price of outside haulage advanced from 2 cents a hundred to 5 cents, it was agreed something must be done.

The drivers of their trucks were then offered a bonus approximating 30 per cent of the savings effected if they would haul the freight themselves, in addition to their delivery work.

In one year when the company would have paid out \$6,000, an average of about \$120 a week for this service, the bonus amounted to approximately \$2,000, divided among eight drivers, in proportion to the tonnage each hauled, and two shippers.

The gross saving to the company, not counting wear and tear on equipment, and gasoline, was therefore \$4,000. When cartage costs further advanced to 7 cents a hundred, this saving became proportionately greater.

Changed conditions made a bonus for this work unnecessary, and a straight bonus of not exceeding \$4 a week is paid each driver at the discretion of the traffic manager, for keeping his trucks in the running.

POOL BONUS FOR PACKERS AND SHIPPERS

Parke, Davis & Company of Detroit have set standard accomplishments for packing and preparing for the load and loading on the basis of hundreds of pounds handled per hour. For instance, three hundred pounds per man

per hour is the standard for packing domestic goods, two hundred pounds per hour for foreign goods, and six hundred pounds per hour for trucking (weighing, marking, stacking, loading, etc.).

The bonus on accomplishments over these standards for the employees participating are pooled, and all share alike. This bonus has not only markedly increased individual production, but the pooled feature has made the slow workers answerable to the quicker workers for picking up in their speed, and has acted as an added incentive.

FREIGHT HAULING BONUS

Another bonus in use by Parke, Davis & Company is a pooled production bonus for hauling freight. It was formerly applied to outside teamsters drawing the union wage from their own bosses, but in the near future will be applied with a changed standard to drivers of their own trucks who will handle the freight haulage.

A fair day's haulage was considered to be twenty-four thousand pounds, carried in three or four loads. The excessive loading time required by this company's miscellaneous goods makes this figure lower than a similar standard in another business.

The bonus for exceeding this standard was 12 cents per hundred pounds. Four men, working full time, participated equally in one month's pooled bonus, at the rate of \$9.59 each—and this was a poor month. A man who worked less than full time would be paid a proportionately smaller share.

BONUSES ON NUMBER OF LOADS

In the National Tube Company operation at McKeesport, Pennsylvania, during the coal shortage, the management set a certain bonus per load for each load above the standard number of loads expected of the different trucks, depending upon the distance of their haul from the mines to the plant.

Two hundred and fifty trucks were engaged in haul-

ing coal to keep the plant in operation for more than a year and the haulage records were remarkable, partly because of the bonus plan and partly because of the intensive time studies made as a basis for showing each operator how to save a minute here or a minute there, and so make more trips during the day.

OTHER PRODUCTION BONUSES

The Hammond Lumber Company offered their men a certain wage for each thousand feet of lumber cut and hauled over a number set as standard, for a day, with very good results.

Emil Schumann of Pittsburgh tried paying his drivers \$30 a week and offered to pay them a commission of 10 per cent on all sales of his truck service made by them on the outside, without sacrificing their regular hauling work.

One driver brought in two new customers the first two weeks. One day a man on the street inquired for someone to do some hauling for him, and the driver earned \$2 commission on the \$20 job that resulted.

The Central Stamping Company of Newark, N.J. when T. D. Pratt had charge of their motor trucks paid the driver a day-rate of \$3 per day, and credited each man with a certain sum per ton mile haulage.

This allowed a man to earn as high as \$9 a day, and at the same time the cost per ton mile must be cut to 6 cents disregarding the ferry charge, which was 2 cents, under the freight cost per ton mile, a 25 per cent saving over freight.

Henry L. Gantt twelve years ago installed a truck bonus plan in Rhode Island with more than the usual care and accuracy.

Most of the operation took place within the plant's yard covering a large area. The regular planning department scheduled the work on a twenty-four hour basis so that approximately at four o'clock in the afternoon the truck foreman knew the materials from each department

that were to be required in each storehouse in the morning to start work.

A definite card of instructions was issued to each driver in that yard before he left at night, telling him where to report, what quantity and class of goods he was to take from the loading point and where to deliver it. Opposite each item on the card of instructions was the time allowed for doing the work.

If he accomplished his task in the time set, or in less than the time set, he was paid a percentage upon the time saved at the guaranteed day-rate whether he earned the bonus or not. The same general plan is in operation today.

A production bonus is that of the Campbell Coal Company of Atlanta, Ga., who base a simple bonus plan on the number and duration of stops, as ascertained by recording devices. Supplementing this information with accurate studies of loading and unloading time, they are able to gauge the allowable "time lost on the road" for the various runs.

Unless the drivers report delays of over two minutes, the time is charged up against them. For each day that the driver has no such "time lost," he is given a star, representing a perfect record.

For six stars, awarded for a full week's work, a driver is given a bonus of \$1.25. Overtime is paid for at the rate of 25 cents an hour, but lost time is deducted before overtime is paid.

If a man makes less than six stars, the bonus is distributed on the basis of \$1 a week, or $16\frac{2}{3}$ cents for each single star.

Nearly every one of the drivers is receiving the full \$1.25 a week.

THE ECONOMY BONUS (B3)

The summary of the Economy Bonus Plans (B3) includes plans for the following purposes:

1. Lowering per mile cost
2. Increasing tire milage
3. Decreasing spring breakage
4. Decreasing accidents
5. Increasing gasoline milage
6. Good behavior
7. Regular attendance
8. Not getting stuck on the road
9. Keeping car out of repair shop
10. Reducing customer complaints

LOWERING PER MILE COSTS

Ward & Ward, Inc., of Buffalo, have worked out a very successful bonus plan based on the cost of operation per mile. With the allowed cost at 7 cents a mile, they give the driver all the saving he can effect on this standard and deduct from his bonus the cost of all accidents unless proved to be outside his control.

Production remains at a predetermined standard because the deliveries are made to customers on fixed routes, under very nearly standard conditions of roads and loads; time does not enter in, because if the driver takes longer than he should he is simply running his day longer without cost to the company. The deduction for accidents has been carefully made under Mr. Ward's personal supervision.

First of all, a fair wage is paid; the man starts at \$20 a week, the next month receives \$22 a week and the sixth month \$24.

In figuring cost per mile on these one and one-half ton trucks, garage cost, depreciation and insurance were not included and it came to gas, oil and tires.

Bonus payments are made every four months. Three drivers earned at the last distribution \$75, \$50, and \$30 respectively; three times that sum for twelve months is a very respectable bonus earning.

Better satisfied drivers, more careful with their trucks, and working for the interest of the company, as well as

lower maintenance cost on the cars were the good results of the use of this bonus plan. Three cars were run nearly a thousand miles a month for eleven months each and were laid up only a total of five days for repairs.

FOUR COMBINED BONUSES

The Gilman Trucking Company of Cleveland offer their drivers four simple bonus payments of \$5 each for accomplishing four different results, as follows:

1. For regular attendance and no absence without excuse previously granted by the foreman.
2. For good behavior
3. For not getting stuck on the road
4. For keeping the truck out of the shop in working hours

This made it possible for each driver to earn \$20 per month for exercising proper care, and resulted in lower cost and greater production to the company.

SPRING AND TIRE BONUS

McCrary Brothers, in the coal and building material business in Pittsburgh, are operating two simple bonus plans with excellent results, the first on tires, and the second on springs.

Each driver is offered \$1 for each thousand miles he runs his truck over the maker's guaranteed seven thousand miles, and \$2 for each thousand miles he runs his duals, or large single tires on the rear wheels, over the maker's guarantee.

When a driver runs his tires fourteen thousand miles, for instance, he earns \$7 bonus on each front wheel and \$14 for each rear wheel, a total of \$42 bonus.

The good results are not only satisfied drivers and increased mileage on tires, for when the rear tires are so handled as to run more miles, it stands to reason that the differential will run more miles and the engine will run further without an overhaul. Careful driving means longer wear on every part of the machine..

A 10 per cent overload is all that is allowed on these

trucks, and the drivers have no desire to put on more load or to speed the trucks because it is working to their detriment in the tire bonus.

One driver that earned a bonus for running his front tires seven thousand miles over the guaranteed distance, hauled seven hundred and seventy tons more in a three months' contest than another driver with a lower tire mileage in the same time, proving that the economy bonus on tires did not lessen the production of the truck.

When William McCrady offered his drivers a \$3 bonus for every month in which no springs were broken, he did it to meet a serious situation, for on one truck they were averaging two broken springs a month at a cost of \$20 each, or \$40. Immediately after this bonus was offered the worst truck in the fleet ran two months without a broken spring.

Again, there was reflected a benefit to the rest of the truck, because the breaking of the spring means the breaking of other parts at the same time. The more careful driving to earn the spring bonus pays hundreds of dollars each year on a machine in lessened repair bills on other parts of the truck.

Joseph Horne Company of Pittsburgh has developed several effective economy bonus plans.

The first bonus is an efficiency bonus, figured by crediting for good conduct and good mileage and debiting the driver for failures and complaints registered by customers with the complaint department.

The second bonus is given for the care of the car. No repairs are made without the authorization of Defect Cards, initialed by the drivers, so that this item as affecting their earnings can be kept in the control of the driver to a certain extent.

The third bonus is for economy in tire cost, or, in other words, for high tire mileage.

The fourth bonus is the half-yearly no-accident bonus. The driver forfeits his whole bonus if he has an accident

within the six months' period, with one exception: he is not responsible if his car, left standing empty at the curb, is hit by another vehicle.

These four bonus plans in conjunction have been very successful in rewarding the better operators, causing the poorer men to strive for better records and the consequent better earning.

Wilson & Co. of Chicago have recently inaugurated a plan of giving prizes for tire economy. They give the driver 30 per cent of the "gravy" on sets of tires or single tires for number of miles run over ten thousand, guarding against damage to the rims by the regulation that tires must be changed when worn down to within $\frac{3}{4}$ inch of the steel base.

POOLED NO-ACCIDENT BONUS

Tiffany Studios of New York have a simple pooled no-accident bonus for the drivers and helpers on their trucks. They feel that alertness and watchfulness on the part of the helpers will tend in great measure to prevent accidents, so they are allowed the same bonus as the drivers.

Each man is allowed a bonus at the rate of \$10 a month, payable twice a year, or \$60 every six months.

It is understood that if an accident occurs through carelessness on the part of any of the drivers or helpers, its cost will be deducted from the bonus fund, so that all of the drivers and helpers will be affected. This makes all of the men take an interest in preventing accidents, not only to themselves, but to each other.

The company carries insurance protecting it against damage to other cars, but they have so few accidents that they have dropped the insurance covering their own trucks and by carrying it themselves, are ahead on the deal.

They have had so few accidents which their insurance has not adequately covered that they have not as

yet made any deductions from the bonus account, so that the men have always received their \$10 per month in full.

If any man leaves their employ he forfeits his interest in the unpaid bonus fund, and it is distributed among the remaining men. This helps to keep the men satisfied with their positions and to hold them on the job.

PLAN NOT GIVEN A FAIR TRIAL

The Miller North Broad Storage Company of Philadelphia operated a similar no-accident bonus plan for three months during the dullest part of their season.

This was an unfortunate time to test it out, by reason of the fact that they were unable at all times to make up the expenses incurred through accidents as promptly as they should have done in a busier season, and it tended to throw discredit upon the bonus.

At the end of three months when they expected to get the greatest benefit from the plan, conditions compelled them to make a substantial raise in the wage of the men, and because of certain weaknesses in the bonus plan, they felt it prudent at the time to abandon it.

PAPER CREDIT BONUS

Parke, Davis & Company of Detroit have a simple economy bonus in use for the drivers of their eight city delivery trucks. Each month that a driver has no accident, whether his own or another driver's fault—and the loss of the smallest piece of equipment is put in the category of accidents—he receives a \$5 paper credit bonus, payable in cash on the first of May each year.

For the least or the greatest accident in a month a driver forfeits his entire \$5 credit. A nightly inspection of the cars at their garage carefully checks up the condition of the machines and their equipment.

The excellent effect of this plan may be seen from a study of the May, 1919, distribution: four drivers received the full amount of \$60, one man received \$50,

and three \$55. One driver with one accident charged against him delivers in the thick of traffic all the year round.

This is the more remarkable when the comprehensiveness of the conditions covered by the bonus is remembered. The four perfect records mean that four cars had suffered no damage whatever from accident, and that they had lost not so much as a wrench during the year's service.

The Jacob Van Skiver Company of Philadelphia have a bonus, or demerit system, for reducing maintenance cost on their fleet of trucks. They pay their drivers \$30 a week if they keep the trucks on the road, but if for any reason a truck is kept in the garage, the driver is penalized \$1, or has his pay reduced from \$5 to \$4 per day until his truck is out again. He may be sent out on another truck if he is not needed to repair his own truck, but must stand the cut in salary just the same.

Whereas the drivers in the past often found something the matter with their cars in bad weather to keep them in the garage, they changed their minds and decided that they would rather drive outside than pay a dollar for the privilege of staying in.

THE CREDIT SYSTEM FOR ECONOMY

The Chicago Motor Bus Company uses its debit and credit system as a pooled bonus plan to increase gasoline mileage, in one month paying out \$300 in increased salaries to secure a saving of \$1,200 in gasoline, and in another case, paying all the employees from a pooled monthly bonus for the reduction of accidents on a mileage basis.

THE SERVICE BONUS (B4)

Service bonuses can hardly be classified with production and economy, or combined bonus plans and credit systems, although they have a definite effect in reducing

the labor turnover and in making drivers satisfied with their jobs.

John Wanamaker has a simple bonus plan of giving the drivers \$50 for every year of continuous service, and helpers \$35 for a year of continuous service, in addition to the regular welfare provisions made for all the employees of the Wanamaker organization.

Strawbridge & Clothier of Philadelphia, another large retail store, has a yearly bonus plan for drivers and helpers.

The Fair, Chicago, offers a two weeks' vacation with full pay after a full year's service, in addition to a Christmas bonus of \$75 after one year's service, \$40 after six months' service, and \$25 after three months' service.

The Crane Company, as is well known, gives every employee a Christmas present of 10 per cent of his yearly wages, which, at the customary wage of truck drivers, would amount to approximately \$150 a year.

This plan is criticised by many as being nothing more than a deferred salary payment, since the 10 per cent bonus is counted on by all the employees when considering whether or not they will leave the company for higher immediate salary somewhere else. It certainly has nothing to do with the productivity or the faithful performance of scheduled duties by the employees individually.

YEARLY BONUS WITH SAVING FEATURE

The Walter J. Crowder Company of Philadelphia have met their labor problem by a systematic campaign to cooperate with their drivers. They formed an employees' organization to promote good fellowship and interest in the company, and instituted a simple bonus plan.

Each of the drivers pays 50 cents a month in dues and the company puts 50 cents with it for a Christmas saving fund; then, just before Christmas, each man receives a check for \$12 from the company.

SYSTEMATIC RAISE IN WAGES

The Erie Service Company of Buffalo find that a scheduled raise in wages keeps the drivers satisfied and works out well for the company.

They start a driver out at \$20 a week, at the end of each month give him a raise of \$1 per week until in six month's time his wage is \$26 a week. In addition they pay 40 cents an hour for overtime. The assured increase each month tends to keep the drivers satisfied until they are getting the maximum; from then on they stick to keep up that maximum income.

BASIS FOR BONUSES MUST VARY WITH CONDITIONS

It is easy to vary the basis of the bonus plans to suit the conditions in any particular business. If a business, for instance, is delivering to a large number of customers on long routes, it would be foolish to try to pay a bonus on the ton mile basis, because the ton mileage in that case would be very difficult to obtain and not worth the trouble. Per package delivered and the tons delivered in the total trip, number of calls made, or some other such basis should be used in such a case.

THE POOLED BONUS

Pooled bonuses have been very successful in certain factories where they have been tried, because as high as seven hundred operatives in a single department or plant can be placed upon a pooled or combined bonus that rewards every employee in the group for production records or economies of that group.

During the war the Goodrich Tire & Rubber Company had as high as seven hundred employees in the balloon department, sharing a pooled bonus on the following basis: Every piece of work produced was credited to the bonus account at a predetermined piece-rate price. The wages for the workers were deducted

in total from this fund and the balance distributed among the workers, all seven hundred of them, in proportion to their wages.

There are many cases where truck operators cannot in fairness accept a certain bonus standard and reward for their different drivers without working injustice upon the men who have the harder route or the more expensive runs for low production. The heavy and expensive run may be the run of lower production also through the exigencies of the business.

In this case a pooled bonus is suggested that credits all the drivers in a pool with the earnings of the fleet as a whole over previous earnings or earnings agreed upon as standard and, after the wages are deducted, leaves a bonus fund to be divided among the men according to the wages earned. The men will see to it in this kind of an arrangement that no one of the men reduces the profits of the others in the group by his laziness or poor methods.

The pool method has been used successfully by the Chicago Motor Bus Company under the credit system, both in the machine repair shop and in the gasoline economy bonus.

Similar results are shown by the Tiffany Studios in their no-accident bonus.

While not having all the advantages of a bonus set upon individual records and paid to the drivers in proportion to their merit as in the Timken plan, the pooled bonus has other advantages not possessed by the individual bonus, because of the close supervision of the poorer workers by the better workers, which the individual system does not so much inspire. It is very much easier in many cases to install the pooled bonus.

OBJECTIONS TO PRODUCTION AND ECONOMY BONUSES

Mr. H. H. Ball, of the Molstedt Lumber & Coal Company, New Rochelle, N.Y., stated that his company put

in a bonus plan some time ago based on the number of tons of coal that his driver could deliver.

Not having a proper check or allowance for extra damage to the equipment, he found that it was only a short time before he had to take the extra help he saved in the production end, and put them in the repair department. He thinks that the result was just simply human nature on the part of the drivers, who got paid to produce without being penalized for causing extra repairing.

REFUTING OBJECTIONS TO AN ECONOMY BONUS

To overcome the objection of lower economy when a production bonus is used, it is necessary for the management to watch an adequate repair cost report of the economy feature, and to keep the repair costs down by the proper inspection, supervision and discipline.

On the other hand, when an economy bonus is used, it is up to the management to install the proper daily service records and monthly summaries of production, and to keep up production by the same methods of supervision and discipline.

Sometimes it is easier to pay a bonus for production and keep down the cost and sometimes it is easier to pay a bonus to keep down the cost, and maintain production by these other methods.

The supervision of good foremen is just as necessary to keep up the production of trucks under an economy bonus as it is on a bricklaying job, a street laborers' gang, or any other kind of work. What truck operators often lack is the proper supervision and the executive management to get the most out of their investment.

Both of these objections are hardly chargeable to the production or economy bonuses, although the bonus plans bring out the lack of proper supervision in the truck operator's company and thereby suffer this

criticism when it really should not be directed against the bonus but against slack methods of operation with which the bonus alone cannot cope.

LABOR TROUBLES AND BONUS PLANS

The misuse of any good idea or plan will naturally bring trouble, though the proper use of the same plan will be of great benefit.

Before installing a bonus plan it is advisable to get the ideas of the best men among the drivers and foremen, as to its probable reception by the men as a whole. It is then necessary to talk with the men individually or in a group at once, or gradually as the bonus is extended to cover each truck, in order to tell them the idea and justice of the whole plan.

William McCrady made the statement at the New York Truck Owners Conference that he believed in paying the good drivers the best wages. His company lets no one in the Pittsburgh district pay higher wages than they, but they give the drivers a bonus for their added efforts.

Any bonus or profit-sharing plans given the men in place of fair wages only produce trouble, and lose their power as an incentive. The management should be willing to pay good wages for good work of the average or better than the average men.

But, when paying bonuses, the management has a right to expect extra effort and extra attention to the interests of the company which these same average men would not give to the ordinary employer and would not give to the bonus employer if he did not pay them this incentive.

It should be explained that the extra money to be paid each driver in the bonus is not there in the treasury now waiting to be paid him, but will be earned by his better work which will justify the promised bonus. In other words, he makes his own bonus by doing better work.

This knocks out that common fallacy of ignorant laboring men that if the boss has the money to pay them a bonus in cash at such and such an interval, he has it to pay in higher wages. Thereupon the men join the forces that have put the idea into their heads and demand a raise in wages without offering to increase production in return.

This is what happened when the Molstedt Lumber & Coal Company of New Rochelle, N.Y., attempted the installation of a production bonus on the tons of coal hauled. The same thing happened when a large manufacturer employing ten or fifteen thousand men announced a profit-sharing plan.

The men struck for higher wages because they did not properly understand the justice of a plan which made it possible for them to earn for themselves higher wages in the form of bonuses, but which guaranteed no higher wages unless the extra money were first earned.

Then there are dangers of improper application which common sense and adaptability of the management can correct, or foresee and avoid.

CONCLUSION

With these thirty-six examples of the four types of bonus plans involving production, economy and service, we have enough successful plans to guarantee the company wishing to put in a bonus for truck drivers a fairly successful experience, if at the start they are careful to avoid the obvious mistakes of others.

These examples show that bonuses correctly applied enable companies to secure better cooperation from their drivers, to lower their truck costs and to improve their service.

CHAPTER VII

BONUSES FOR IMPROVED QUALITY

Bonuses offered specifically for improved quality in a product are rare; this section, therefore, gives only a few examples. It is obvious that bonuses for improved production assume that the product must necessarily pass inspection as to its quality.

Such bonuses are particularly applicable in cases where a very high grade of product is desired and where quantity production is not of first importance.

ELECTRIC STORAGE BATTERY COMPANY, PHILADELPHIA ¹

One of our operations consists of slotting hollow rubber tubes, thirty-six inches long, with a series of fine saw cuts at right angles to the length. There are approximately one thousand cuts to each tube.

The operation is performed by automatic slotting machines, which are operated by girls. The girl's duties are to put tubes in the machine, to take finished tubes out and to stop the machine and report to the machine adjuster whenever the machines are not running properly. One machine adjuster tends to adjusting and changing saws for each row of eight machines.

Originally each girl operated two machines and was paid on a straight day-work basis. Although the actual time of putting in and taking out the tubes consumed only one-quarter of her time, it was not considered advisable for a girl to operate more than two machines,

¹ By R. I. Merwin, Assistant to Superintendent of The Electric Storage Battery Co., Philadelphia. 100%. May, 1920.

but rather to allow plenty of time for her to handle the tubes carefully and watch for defects, because the cost of each tube was a very appreciable amount, and it was much better to produce a small number of perfect tubes than to spoil a lot in an endeavor to produce a large amount.

In spite of the fact that the operators were allowed so much time and in spite of the fact that every effort was made to impress upon them the importance of quality above everything else, the percentage of good tubes produced only amounted to 70 per cent of the number of tubes issued.

We decided to offer a premium for attaining a high percentage of good work.

THE QUALITY PREMIUM

Each operator was therefore charged with the number of tubes issued to her each day and credited with the number of perfect tubes passed by the inspector. The premium was paid according to the following schedule:

Good tubes per day	Premium per day
75 per cent to 80 per cent.....	5 cents
81 per cent to 85 per cent.....	15 cents
86 per cent to 90 per cent.....	30 cents
91 per cent to 95 per cent.....	50 cents
Over 95 per cent.....	75 cents

This premium was paid in addition to the straight time rate per day. No premium was paid unless the production reached a certain minimum, but this figure was low enough to be very easily reached.

It will be noticed that the premium was low for the low percentages, but meant a very substantial increase in pay for attaining a high percentage, and we were convinced that a high percentage could be reached.

The machine adjusters were also paid a daily premium equivalent to the average daily premium earned

by the girls operating the machines under their supervision.

By means of this premium an inducement was offered to the operators and machine adjusters to produce good work.

The result was an immediate improvement in the percentage of good tubes. It has gradually improved until today practically all of the experienced operators are exceeding the 95 per cent mark and are earning a daily premium of 75 cents. The average for the entire department is between 90 per cent and 95 per cent, depending upon the number of new operators in the department.

INCREASING PRODUCTION

After the quality premium had been in effect for some time, and it was seen how easy it was to reach a high percentage of good tubes, it also became evident that a greater number of tubes could be produced per operator without sacrificing quality or making the work too hard for the operator.

An additional premium was therefore offered for any increase in production over the average which had been produced up to that time. This premium was paid at the rate of so much per tube for all tubes in excess of the old average per day.

At first the operators did not take kindly to this plan, but before very long one or two went after the increased production and the rest, seeing how easy it was, soon followed. Each operator now operates four machines and turns out over twice as much work as before, without any loss in quality.

The introduction of the quality premium was thus directly responsible for increasing the percentage of good tubes from 70 per cent to over 90 per cent, and indirectly responsible for increasing production over 100 per cent.

DUFF MANUFACTURING COMPANY, PITTSBURGH¹

As generally applied, a bonus system is based on quantity rather than quality. On the other hand, heat treatment is preeminently a quality operation, and in connecting a bonus system with it every care must be taken to maintain, or preferably increase, the quality as well as the quantity. For the average shop, therefore, a satisfactory system should embody the following features: (1) Increased quality; (2) increased quantity; (3) adaptability to a wide range of material and conditions and (4) ease of computation.

With the above requisites in mind, a system, as covered by the following announcement, was put into effect at the plant of the Duff Manufacturing Co., Pittsburgh.

The following bonus regulations will be in force for the men in the heat-treating department.

Heaters: Heats are to be run according to the following regulations:

(1) *TEMPERATURE.* The temperature, after the material is soaked out, must be kept within these limits: Annealing and carbonizing, plus or minus 20 deg. Fahr. Quenching and drawing, plus or minus 10 deg. Fahr.

(2) *TIME.* The times for various heats are as follows: No. 1 and No. 2 furnace—Soak out in 1 hr.; hold $\frac{1}{2}$ hr.; total maximum time not over 2 hr. (And so on for the various types of furnaces and classes of work, carbonizing, annealing, etc.)

The number of heats run by each heater within the above limits will be figured on a percentage basis for a week's time and bonus paid as follows:

Efficiency, Per cent	Bonus per hour	Efficiency, Per cent	Bonus per hour
90.....	\$0.005	96.....	\$0.06
91.....	0.01	97.....	0.07
92.....	0.02	98.....	0.08
93.....	0.03	99.....	0.09
94.....	0.04	100.....	0.10
95.....	0.05		

¹ By A. A. Blue, Duff Manufacturing Co., Pittsburgh. Iron Age. 107:687-9. March 17, 1921.

The temperature will be taken from the record on the pyrometer. In case of instrument trouble, the heat will not be considered either way, unless the heat was "off" before the trouble occurred.

The above times are on the basis of the following minimum weights per furnace charge:

No. 1 and No. 2 furnaces, 300 lb.

The time will be counted from the last piece charged in the furnace to the first piece pulled out and shall be so entered by the foreman on the ticket. The foreman shall also inspect all heats when "soaked out" and note the time on the tickets. Each heater will be required to run from 1 to 4 furnaces.

In case of a heat running from one shift to the next, the heater having run it the greater length of time will be responsible.

Exceptions to the above are: (1) die blocks, (2) ball races, and (3) shear blades, where the temperatures only will be considered.

The above times are based on the continuous operation of a hot furnace, and do not apply to the first heat in a cold furnace, when the temperature only will be considered.

Helpers: Helpers will be paid a bonus on the following basis:

Pounds per Furnace-hour	Bonus per hour
170 to 180.....	\$0.01
180 to 190.....	0.02
190 to 200.....	0.03
200 to 210.....	0.04
210 to 220.....	0.05
220 to 230.....	0.06
230 to 240.....	0.07
240 to 250.....	0.08
250 and over.....	0.10

These figures are obtained by dividing the total weight of material handled during the week by the number of hours all active furnaces are in operation. When all work for a furnace has been completed this fact will be reported by the foreman and the furnace will not be counted as active again until more work arrives.

The figures are "overall" taking into account all work done, that is, carbonizing, annealing, quenching, etc. Men on both shifts will receive the same bonus.

Work handled twice will be considered as double weight; that is, material quenched and drawn back will be counted twice. Likewise, material double-quenched will be counted twice.

Work which fails to pass test on standard treatments will be retreated to pass without credit being received toward the bonus.

The weight handled will be based on the count made by the inspector and each ticket must bear the inspector's OK for the count.

Foremen: The foremen will each receive 10 per cent of the total bonus in the department.

No man will receive any bonus for any week in which he has been absent, unexcused.

The conditions to which the above outline was applied covered a very wide range of parts and materials used in the manufacture of various types of lifting jacks and commercial drop forgings and forging dies, such as high carbon, high chrome ball races; large pinions, carbonized; small bushings, carbonized; nickel chrome gears; carbon steel gears; die blocks, trimming knives, etc.

Three different types of furnaces are used, making necessary separate figures for each type. The Leeds & Northrup recording potentiometer system is used for controlling the temperature, one couple being in the front and one in the back of each furnace. These couples are lowered in contact with the material in the furnace as soon as the furnace is charged, and instant dismissal is the penalty for tampering with the couple pipes until they are raised to permit the heat to be pulled when finished. The men are divided into heaters and helpers. The heater is required simply to heat the furnaces, while the helpers charge them, do the quenching and pulling of heats. A foreman, of course, is in charge.

Before establishing any such system, a careful study must be made of the following points: (1) A standard weight to be charged in a given type of furnace; (2) a standard time to bring this weight to an average temperature; (3) the length of time necessary to hold at heat to insure every part being fully heated; (4) it is also desirable to minimize the types of treat-

ments as far as possible so as to facilitate making up furnace charges and to familiarize the heaters with how to run their furnaces to the best advantage for each temperature.

Referring back to the features desired to be covered by such a system, the effects are as follows:

(1) *Quality*. The heaters are paid primarily on the excellence of their heats, which, of course, represents quality. Also, the quantity element is brought in, as regards the time allowances made.

(2) *Quantity*. The helpers are paid pre-eminently on quantity, it being to their advantage to clean up the work as soon as possible, whether there be a month's work ahead or only enough for one furnace.

Also, the quality element is applied to them, for, if the material is not quenched properly so as to pass test, they must retreat the material without credit. In the above manner, the heater and helpers act as a sort of "checks and balance" system on each other, it being to the heater's advantage to have a small charge in his furnace, so he can meet the time easily, whereas the helpers want as much in the furnace as possible.

(3) *Application to a Large Range of Material*. (This has been mentioned already.)

(4) *Ease of Computation*. It requires but a short time every day to have the furnace records checked over and credit given to the heaters for their heats in the preceding 24 hours. As for the helpers, all that is necessary at the end of the week is to add up the weight handled, doubling up for material handled twice and divide by the number of active furnace hours. If a furnace runs the entire week, this means the total number of working hours in the week is charged against the furnace. Otherwise, a deduction is made for time when there is no work waiting on the floor, or the furnace is being repaired or idle for other reasons. The figure of "pounds per furnace hour" is not a sensitive

one, when taken in groups of 10 lb. at a time; that is, a few hours or a few pounds will not affect the result to the bonus rate appreciably, which is an aid in its computation.

Just how this system works out in actual practice can be shown by the following figures taken from the company's experience with it:

Heaters: The first week the system was applied, two heaters' "efficiency" averages were as follows: 74.5 per cent and 81.0 per cent. The next week, they were respectively 97 per cent and 96 per cent; the following week, 95 per cent and 96 per cent. Not since the first week have the heaters failed to make a bonus on the records of their heats.

Helpers: Before the system was put into effect, the figures for "pounds per furnace hour" averaged around 150 to 160. It was felt that this was low and the rate was set correspondingly higher. The first week, the figure made was 245; next week, 249; third week, 235; fourth week, 208, etc. As in the case of the heaters, the helpers have always managed to score and the company was successful enough in setting the rate so that it was not a "walk-away," and, so far, the workmen have not yet made the maximum. By clubbing the bonus of all helpers together, a degree of cooperation between shifts and between men working on the same shift has been obtained not previously realized.

Foremen: It is to the advantage of the foreman, of course, to see that all of his men get as high a bonus as possible.

All new systems cause some little difficulty in installing them. However, the company's experience in this case has been very free from such troubles, practically the only friction being due to the feature of receiving no bonus on account of absence. Two men quit the first week on this account, but the rule was enforced, and has given no more trouble.

All such systems, of course, have defects, especially in reducing the flexibility of operation, but, in cases of standard routine material, this is not frequently troublesome. Another defect is found when a man—say a helper—is absent. This throws the burden of more work on his associates, and, although they do more work than they would have to otherwise, they may get less bonus, due to not being able to handle the furnaces so quickly. However, the penalty attached to absence has prevented this feature from appearing sufficiently to cause any difficulty.

The Bonus Is Reported Weekly to the Timekeeping Department,
a Copy at the Same Time Being Posted in the
Shop for the Inspection of the Men.

HEAT-TREATING DEPARTMENT

9-27-20.

Bonuses Earned in Week Ended Sept. 25, 1920

Heaters

Murphy	219	87 per cent	No bonus
Lewis	225	95 per cent	\$0.05 per hour
Jenkins	230	96 per cent	.06 per hour
Ross	283	94 per cent	.04 per hour

Helpers

Total weight handled, lb.....	162,444
Total furnace hr.	692
Pounds per furnace-hr.	235
Bonus rate per hr.	\$0.07

This applies to:

Lutz	218	Salvo	270
Lehman	220	Livitz	250
Kopf	222	Kimick	242
Hindman	231	Marunchick	234

Foremen

Total bonus for week	\$45.00
10 per cent of same	4.50

This applies to:

Welty	278	
McGregor	272	Metallurgist

CHAPTER VIII

BONUSES FOR ECONOMY

A GROUP ECONOMY BONUS THAT INCREASED PRODUCTION 26 PER CENT¹

Theoretically, a worker on piece-rates which are fairly set has every incentive to get maximum output. But every manufacturer knows that it doesn't work out that way.

I don't pretend to have found an unfailing specific for soldiering, but I do know that frequently the group economy bonus will get production when piece-rates won't. A knitting mill I have in mind is a good example of what can be done by this means.

Our first step in this plant was to do everything possible to speed production by planning the work, and by supplying the most modern machines and methods that were available.

It then remained to stimulate the working force to extra effort. That the possibility of increase from that source existed had been determined by time studies, which showed that few of the operators worked at anything near their actual capacity. It was necessary, therefore, to find an incentive to get them to do more.

As all of them were on piece-work, it might seem at first thought that sufficient incentive already existed—that they would at least try to earn the maximum that could be had without undue effort. It is right here that economics fall down when it assumes that all men are acquisitive and thrifty.

¹ By W. R. Basset and W. T. Fitzpatrick of Miller, Franklin, Basset and Company. Factory. 24 : 817-19. March 15, 1920.

Although on the surface men and women appear to be acquisitive, most of them have set a certain weekly earning as their goal and when that sum is reached, they prefer leisure to extra money. There are exceptions, almost as rare as are misers, but I believe this is the experience most employers have had during the past few years of rising wages. In most industries where wages have increased greatly, it is the same—a worker lays off after having earned in four or five days the sum he used to earn in six.

Although this attitude is hard to account for with men workers who more often than not have families to support, it is easier to understand—and harder to combat—with women who as a rule work solely for their own support. And most of the hands in this plant are women. Except for occasional middle-aged women, most female employees look upon factory jobs as fill-ins until some good provider comes along. They seldom want more than enough to cover running expenses. Saving for the future makes no appeal; their future husbands will provide the future funds.

With this condition to face—that added earnings easily attainable were not attractive enough to call forth extra effort—it may seem that no bonus plan would be effective. But a bit of psychology apparently gets in its subtle work here.

The group economy bonus is paid to everyone in a department. Its amount depends on the efficiency of the department as a whole. Therefore, if any one worker is slack, the others in that department suffer. So, though the individual may not care for extra earnings, there are few whose consciences or whose fear of others' tongues will let them deprive their fellows of earnings they may want or need. For instance, in one department employing women, enforced idleness with consequent decreased earnings resulted when the flow of garments from the cutting room, the preceding

department, fell off. When, therefore, a cutter decided to take a day off, he brought upon himself such a tongue-lashing from those in the succeeding department, that he decided thenceforth to stay on the job.

The group economy bonuses were based on savings of three kinds: (1) reduction of unit overhead expense through increased production; (2) savings in expense material such as needles, waste, oil, and so on; and (3) savings in direct material.

In order to set bonuses it was first necessary to install a system of cost accounting which would give accurate departmental costs, not only as to direct material and labor, but as to overhead expense. Then, for three months, normal costs were collected to furnish a basis for figuring future savings. These normal costs were those that obtained after the management had exhausted its ingenuity in attaining efficient operation.

It then remained to determine a basis for sharing the savings made by the workers between them and the company. Although the management was primarily after increased production and would have been willing to give the workers all of the saving in order to get it, it was found that this was not necessary. We obtained not only more output, but in most departments a substantial money saving as well.

At the outset, it was understood that the bonus would be a definite measurable part of the saving and not a sop thrown to the workers at the discretion of the directors. That may work for a while, but being charity, and usually dishonest in intent, cannot continue long.

What was not wanted was an economy bonus like that once observed in a plant where a disastrous strike had occurred a few months after the plan was put on. The bonus had been introduced with much pomp and sanctimonious talk of "the square deal," "the right of the worker to share in the savings" and other pap of a similar, familiar sort.

Then at the end of the month, whether there had been a saving or not, the directors of the misguided concern said in effect, "Oh, well, they'll be satisfied with so much," and proceeded to pass it out with more platitudes. There was no predetermined basis of division, and it did not take the workmen long to find that out. They discovered, too, that they got a bonus whether they effected economies or not. Before long, the men struck for more wages. Knowing that the bonus payment depended principally upon the unreliable digestions of the directors, they wanted to make sure it would be forthcoming, and they cannily felt that the best way to assure it was to get it added to their wages.

While the group economy bonus is no new thing, it is rare to find it strictly on the square; so square that the management is willing to explain in detail just how it works, so that the men can see for themselves that there is a definite way of dividing the saving.

We started with the idea that no bonus less than 10 per cent of the worker's wage would be an effective spur. The sky was to be the top limit. This was, therefore, the basis on which the work was carried on, and was, incidentally, the only part of the whole proceeding which was not mentioned to the workers. With this as a starting point, the basis of division for every department, productive and contributory, was worked out—and most of them were different.

Ten per cent above the wages was set as the bonus to be paid for savings in overhead expense made by increasing production—any saving of material was to be given as an extra incentive. To show just what was done, it will suffice to describe the method of setting the bonus in two departments, one productive and the other contributory.

In the productive department, the overhead expense, exclusive of supplies, was roughly \$10,000 a month and the payroll to productive operators, all of whom were on piece-work, was also on an average of \$10,000. We there-

for wanted to give a minimum bonus of \$1,000 for increased production. Time studies showed that it should be easily possible for the operators to increase their production 25 per cent without increased fatigue. As the \$10,000 overhead should not increase materially for a 25 per cent increase in production, this increase would result in a saving overhead of 8 cents a garment.

On a basis of the old production of twenty-five thousand garments a month, this meant a saving of \$2,000—twice what was considered necessary to give as a bonus.

Therefore the workers in this department were told that they would get 50 per cent of the savings in overhead, and it was explained to them in detail what overhead expense is and just how increasing production decreases the amount of overhead that each garment they turn out must bear. Two things were noticeable; first, that these mill hands, mostly women, grasped the idea quickly; and second, that they seemed glad to be taken into the confidence of the management.

In some departments where the fixed overhead charges were in a low ratio to the productive payroll, it was necessary to give the entire saving in overhead expense as a bonus, which the management was willing to do to get the increase in production. This was true in the packing and shipping department, for instance.

On top of this bonus was given throughout the mill a flat half of the saving in material, whether it was direct material like cloth, or indirect, like needles, and so on.

When the bonus plan was announced, it was explained to each department the exact basis on which the plan was figured. The workers were told that if they wanted to see the records, any department could elect a committee of two which could examine all of the records for that department.

The workers were also told the whole story back of the bonus; that the management had done all it could to boost production, even to hiring outside engineers to

come in and better the plant and its methods; that further improvements were undoubtedly possible but that they could only come from the increased efforts of the workers themselves.

They were further assured that the present basis of bonus would not affect their piece-rates and that it would remain in force for six months.

It was explained that outside influences, such as the price of material, fluctuated and that a great change in price might work an injustice either upon them or upon the company unless the basis of division was changed from time to time to conform to these outside changes. They accepted this idea as fair. It was guaranteed that the basic operation expense upon which the bonus is figured would not be changed because of economies they might effect. In this respect, incidentally, this plan differs from most others of the sort. It is obviously not fair when a worker improves his methods to make the new standard the normal on which his future bonuses shall be based. The best that the management has been able to attain must remain the normal.

After all, however delectable a method of this kind may sound, the real proof of its value is in the reaction of the workers to it. A few of the results are shown on the preceding pages.

Possibly the most interesting incident following the introduction of the bonus was one in which the general manager, dye boss, millwright and foreman were all involved. It was the general manager's contention that the dye house could be successfully operated on eighty pounds of steam as well as on the customary one hundred and ten pounds. The dye house boss objected, saying that his production would be seriously curtailed by such a step. Deeming it unwise to cross the temperamental dye boss, the idea was dropped.

One day about a week later, however, the foreman and the millwright dropped in on the general manager

with the suggestion that on the next Sunday, unknown to the dye boss, they put a reducing valve on the steam line to the dye house and let it operate on eighty pounds and note the result.

The general manager agreed to their scheme; the reducing valve was installed and the figures show that the dye house production has steadily increased. The foreman and millwright are now sharing \$8 a week, as an average of six hundred pounds of coal a day is saved directly as a result of their interest and ingenuity.

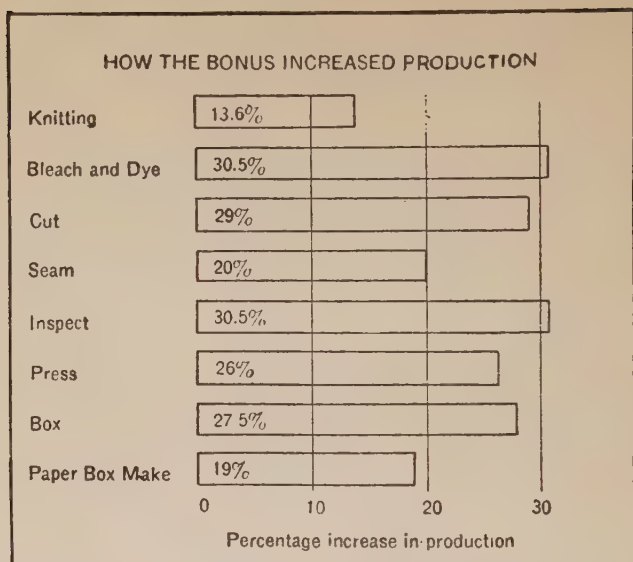
The management does not sit back, however, and trust to the ingenuity of the workers to show the way to savings. It frequently gets out printed slips showing what savings have been made and suggesting possible other savings. While, as a rule, the workers themselves, being closer to the work, see the opportunities first, the management nevertheless knows many places where economies might be practised but has had no way to achieve them heretofore.

But after all, the saving of material in this case was of secondary importance. What we were after most of all was to increase production, and while the management welcomes any saving that reduces costs, it looks upon the saving of material principally as a way to let the workers increase the size of their bonuses.

The first month's operation under the economy bonus showed notable increases in production throughout the plant as the graphic chart shows (on following page).

Today the plant is, as a whole, turning out 26 per cent more garments than before—as a result of the economy bonus.

It was not done by putting in slapdash any kind of "system," nor was it done by any of the speeding processes which so often antagonize workers. Efficient the plant undoubtedly is; but the methods used were based upon common sense and knowledge of workmen and their ways.



Managers of industrial enterprises must recognize the fact that the management of any concern, either by itself or through production engineers, can go only so far in making betterments. Proper machinery in correct balance it can furnish; it can set standard times; it can plan production. But the passive indifference of the workers is a serious barrier. This barrier can only be passed with the help of the workers themselves, and it is here that the principles of industrial democracy are often of value.

From our experience it seems most logical to start at the bottom with things the workmen understand, and give them no more than necessary to get the results. If an economy bonus will get them, well and good—why give more?

But if for some reason peculiar to some particular plant, the bonus does not get results, it may be necessary and desirable to go farther and give the men, through

departmental committees, a say in some of the points of management. And so on to the extent even of putting in a complete form of self-government, but that only if no less will do. To play safe, always start with little and build up, rather than give all at first, or worse yet, pretend to give all while actually giving nothing but the form.

That the maximum results can be gained without giving the men full self-government is amply proved by this experience. All that was given was a share of the savings. But this was given on a straightforward, honest-Injun basis—no philanthropy and no mystery. Unless a plan like this can stand the scrutiny of the workers, it deserves to fail—and it usually does.

100 PER CENT OF SAVINGS GIVEN AS BONUS

EASTON FURNITURE MANUFACTURING COMPANY EASTON, MARYLAND

The following is the full statement of the plan of the company, as originally made to its employees.

Beginning March 1, 1920, this company will pay a bonus of 100 per cent of the actual saving in labor costs due to increased production.

For the satisfactory accomplishment of this object a committee of sixteen will be selected as follows:

Eight men will be appointed by the President of the company from the officials and foremen. Eight men will be elected by the employees, taking two from each of the following Departments: Mill, Cabinet Room, Finishing and Rubbing and Packing Departments.

The committeemen from the above departments shall be elected by the men in the several departments casting a secret ballot for two men to represent said department on said committee. Such ballot shall count one vote for each year the man casting said vote has been in the employ of the company.

QUALIFICATION

Any employee who has been with the company for a period of ninety days prior to the election is entitled to a vote, excepting foremen, sub-foremen, and other employees having the power of employment or discharge.

Any employee who is twenty-one years of age and who has been in the continuous employ of the company for one year or more is eligible for election on this committee. At least 75 per cent of the eligible voters in any one department must cast ballots at any nomination or election to make it valid.

A representative ceases to hold office when his term of employment with the company ends; if he is transferred from the department from which he was elected to another department; if he is appointed to a position within the company as to make him ineligible to vote or hold office as an employee representative or if he is recalled by those electing him. All representatives hold office for a period of one year, or until their successors have been appointed.

PROCEDURE

The Board of Cooperation shall elect two chairmen, one from the employees' representative; the other shall be the general manager of the company. These chairmen shall preside at alternate meetings, having the right to vote and the privilege to debate from the floor.

The Secretary is appointed outside of the membership and does not have the voting power.

An Executive Committee composed of the general manager, who shall act as chairman, and two men elected from the representatives of the workmen and two men by the foremen. This Executive Committee shall determine labor costs that are to be used as a basis in computing bonus and handle any other matters that the manager may see fit to bring to them for council.

All suggestions and grievances from any department are first to be taken up with a committeeman of that department and this committeeman, when necessary, will take same up with the board of directors, who shall have full power to dispose of same.

The employment of the men for each department rests with the committee of that department. The recommendation for an increase in pay and the dismissal of any employee rests with the committee of that department.

Any employee leaving prior to a settlement period will lose his interest in the bonus for that period.

The following record cards will be provided, namely: Lay-off cards, discharge cards, sick cards, which, when countersigned by the committeemen of the several departments and turned into the office, will serve as records.

Production will be based on stock complete in the finishing room and figured by the fixed standard piece-price, as determined by the Executive Committee.

At the end of each three months the factory output in pieces will be multiplied by the present cost-piece price and the difference between this amount and the wage paid for the same period will be prorated to each workman on the basis of **his wages for the period**.

The first settlement to be made June 30 for the months of March, April, and May.

As an example, say the present labor cost is ascertained by the Executive Committee to be \$10, and the number of pieces produced for the period of three months is three thousand, the present wage would be \$30,000. The next period, say the plant produces three thousand and three hundred pieces, for which the factory will pay \$10, or \$33,000. Then there would be \$3,000 to be distributed to the employees in proportion to the wages they have already earned.

Every employee of the company outside of the office will participate in the bonus as defined above.

This plan will give the workmen every cent of gain

made; if the production is doubled the net return of labor is doubled.

The company will receive only the profits accruing from the large volume of sales.

The board of directors shall hold monthly meetings on the second Monday of each month at 8 P.M. o'clock at the factory's office, when all matters pertaining to the successful operation of the plant will be considered. Each director will be paid a per diem of \$2 for attendance at these monthly meetings.

EMPLOYEES SHARE IN ADDED NET INCOME

"COOPERATIVE DIVIDEND" PLAN OF PHILADELPHIA RAPID TRANSIT COMPANY

The plan for a "cooperative dividend," which was inaugurated by President Mitten of the Philadelphia Rapid Transit System is explained below by excerpts from a speech of Mr. Mitten to the employees, explaining the plan.

With employees satisfied and public well served, with P.R.T. property built up, and the equivalent of 6 per cent earned upon P.R.T. \$30,000,000 paid in capital, cooperative accomplishment has reached the goal set for it in 1911.

P.R.T. Men and Management can undoubtedly repeat the good work of 1921, and produce net income of \$1,800,000 for 1922, which is the amount required to pay a dividend of 6 per cent on P.R.T. capital stock.

Operating costs of 1922 can, I am sure, be reduced at least \$1,500,000 by extra effort of men and management and this without any lessening of service.

The Plan which I propose to submit for approval of P.R.T. stockholders provides that cooperating employees receive, in recognition of cooperative accomplishment, cooperative dividend, limited to the added net income produced, but not to exceed in amount 10 per cent of P.R.T. payroll. Payment of 6 per cent P.R.T. dividend is to be first accomplished, followed by cooperative dividend to P.R.T. employees.

This plan will, in effect, make P.R.T. a stock of preference, the 6 per cent dividend on which is underwritten by men and management, who must reduce 1922 operating costs not less than \$1,500,000, in order to make possible a cooperative dividend to employees equalling 10 per cent of P.R.T. payroll.

A BONUS FOR REDUCING ACCIDENTS ¹

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has in operation a bonus plan whereby employees in the transportation department receive part of the savings secured by more careful attention to the prevention of injuries and accidents. According to Bruce Cameron, superintendent of transportation United Railways, St. Louis, Mo., who made an investigation of the system in Milwaukee and submitted a report to President Richard McCulloch, the employees in Milwaukee are enthusiastic over the success of the plan during its eighteen months of operation.

Mr. Cameron's report, which was abstracted in a recent issue of the United Railways Bulletin, stated that a certain per cent of the gross revenue of the Milwaukee Electric Railway & Light Company is set aside each year to pay injury and damage expenses arising from the operation of the cars. Any saving made from the allowance is partly distributed in the form of a bonus to the employees in the transportation department. If, for example, \$500,000 is set aside to meet injury and damage payments and only \$400,000 is expended because of increased care and intelligent operation of the cars, 40 per cent of this \$100,000 saving (or \$40,000) is divided among the employees. A similar percentage goes to the company, and the remaining 20 per cent into a fund for keeping the records. The bonus paid to the men is in addition to the present wage scale and system of compensating the employees according to the length of service.

The motormen and other employees who are entitled to receive a bonus draw 73 per cent of the employees' share, and the conductors entitled to a bonus draw the remaining 27 per cent. The bonuses received by the motormen and conductors climbed steadily during the first year until motormen were earning \$7 extra each month and the conductors about \$5 each month. The other employees

¹ Electric Railway Journal. Vol. 49. 5 : 209-10. February, 1917.

in the transportation department, such as division superintendents, supervisors, foremen, clerks and miscellaneous car service men, received approximately the same amount of extra money. All employees are figured on the same average of earning capacity, about \$1,200 each year, so that the motormen and conductors have an almost equal standing with the superintendents, supervisors and foremen.

In addition to the money allowed to meet injury and damage payments, the report says that another sum is set aside for the maintenance of equipment. If by careful operation there are fewer collisions and less property is destroyed, the difference between the allowance and the cost of repairs and replacements is divided. Moreover, the saving in power through the intelligent operation of the cars figures in the bonus appropriation. A certain sum is also established as the reasonable earnings per car-mile, and if every car hauls its own load, keep on its own space or secures increased fares, the difference earned above the sum designated is divided among the employees.

The right of employees to share in the bonus distribution is determined from their records. The company has a grade book, and all infractions of rules carry with them a certain number of demerit marks. At the first of the month each employee starts out with 1000 merit marks to his credit. If he is demerited in accordance with the grade book and fails to maintain a grade of 750 points, he loses the right to participate in the bonus for that month, while the careful and efficient profit through his carelessness. Any employee demerited 250 points in three consecutive months is liable to dismissal. The demerits for each accident or violation of rules are determined in the first instance by the division superintendent, the right of appeal being reserved in turn to the bonus committee, the superintendent of transportation and the general manager or president.

The bonus committee at each carhouse consists of the division superintendent as chairman, the director of the Employees' Mutual Benefit Association from that carhouse, and another employee of the transportation department. If the director happens to be a motorman, then a conductor is elected to be the other representative, and vice versa. The motorman or conductor chosen must have a service record of at least three years with the company and be in good standing.

There are no lay-offs or suspensions on account of infractions of the rules of the grade book. The division superintendent posts the demerits in the assembly room of the carhouse. The superintendents, supervisors, foremen, clerks, etc., are demerited on account of infractions of the rules the same as motormen and conductors. Their infractions pertain particularly to negligence in not looking after the cars, letting a space go by unattended, not furnishing the proper service or not attending to duty in any other way.

The Milwaukee plan, according to Superintendent Cameron, gives all employees of the transportation department direct responsibility and interest in reducing the cost of operation, increased safety and revenues from car operation, provides a system for enforcing discipline, and recognizes and rewards the services of efficient men whose treatment of the public earns good will for the company.

BONUS SYSTEM FOR FIREMEN ¹

After a boiler plant has been provided with the necessary instruments and the fireman has been instructed how to do the firing, it is almost impossible to maintain a high efficiency without the use of a proper bonus system. The fireman can waste or save a large amount of fuel, and

¹ By C. V. Serbell. *Power*. 46 : 356-7. September 11, 1917.

he should therefore be entitled to at least a small part of what he is saving for the owners. Every boiler plant needs instruments to show the daily output and input, a CO₂ (carbon dioxide) machine to guide the fireman in the burning of fuel economically, supervision as to how to handle the instrument and do the firing accordingly and a fair bonus system. To these might be added a simple boiler-plant accounting system.

The daily output can be measured with one of the several types of recording water meters or with a recording and integrating steam-flow meter. I have found the latter most satisfactory where some of the condensation is returned directly to the boiler at a high temperature and cannot be measured. The steam-flow meter has another advantage in that an instrument for each boiler can easily be installed where it can be readily seen. It does not measure the water blown out from the boiler—only the actual amount evaporated and admitted to the piping system. The input or the coal can be weighed on an ordinary platform scale and the weight of the coal during the month checked against the weight of the coal delivered to the plant at least every month so as to avoid mistakes.

Besides this, the coal ought to be analyzed a few times each month. The information thus gained, together with the average steam pressure, temperature of the feed water and superheat of the steam (if any) or moisture in the steam, will enable one to figure the efficiency of the boiler plant.

As a guide to the fireman to use the proper amount of air for combustion, a draft gage mounted on the boiler front and connected to the furnace will answer the purpose, together with a CO₂ apparatus for analyzing the flue gases. The fireman should receive instruction how to intelligently read the instrument and change the method of firing so as to obtain a CO₂ of about 12 per cent, depending on the fuel. In order to regulate the draft the damper ought to be so connected that the firemen can operate it from the front of the boiler. A pyrometer or thermometer

in the chimney below the damper is also necessary in order to check the losses from the gases escaping through the chimney. A temperature from 150 to 200 deg. F. above the temperature of the saturated steam is proper. The bonus system must be based on the savings obtained above a certain standard or basis; in other words, the firemen must feel that they are getting a part of what they are saving. This is a point usually neglected, but is absolutely necessary in order to secure the full cooperation of the men.

Form 5-L

Boiler Department

MAR 1917

Statement For

Weight of Coal Burned, Lbs.	1,104,479
Weight of Ashes, Lbs.	124,494
Loss in Ashes, %	11.2
Weight of Water Evaporated, Lbs. to Saturated Steam of 100 Lbs.	10,701,000
Lbs. Water Per Lbs. of Coal Evaporated to Saturated Steam of 100 Lbs.	9.9
Average Analysis of Coals	14,070
Average Efficiency of Boiler and Furnaces	72.3

Bonus Basis = 9 Lb. of water evaporated per lb. of coal (14,500 b.t.u.) Coal with 14,070 b.t.u. = 8.73 lb.
 Coal saved = $\frac{10,701,000}{8.73} - 1,104,479 = 121,300$ lb.
 Bonus = $\frac{121,300 \times 3 \times 15}{2000 \times 100} = \27.29

MONTHLY STATEMENT OF FIREMEN'S BONUS

For the last six months the writer has been using a bonus system for the firemen, and with the help of the aforementioned instrument has been able to maintain an efficiency of the boiler and furnaces of above 69 per cent, coal used for banked fire and for firing up boilers included.

The system is as follows: An efficiency of more than 65 per cent or an evaporation of more than 9 lb. of water per pound of coal of 14,500 B.t.u. an average steam pressure of 100 lb. gage and a feed-water temperature of 170 deg. F. form the basis for figuring the bonus. No correction is made for moisture in the steam, but due correction for steam pressure and superheat of the steam and and for the B.t.u. in the coal. More than 65 per cent efficiency is considered as a saving and is figured as follows for coal with a heat value of 14,500 B.t.u. per pound as fired:

Water evaporated in lb. during month

9

—coal actually burned during the month=coal saved

If the price of the coal is \$3 per ton (2000 lb.) the saving in dollars will be

$$\frac{\text{Pounds coal saved} \times 3}{2000}$$

Fifteen per cent of this saving has been divided between the men in the boiler room (see monthly statement). The coal and ashes are weighed every twenty-four hours and noted on the daily coal-consumption sheet, together with the daily evaporation for each boiler from the steam-flow meters, with necessary corrections. A copy of this sheet is sent to the office, and in this way the management each morning can see what was done the previous day in the boiler room. For each month a statement from the boiler department is made up (see

statement), and from this the bonus is figured out as outlined.

The cost of the apparatus used is small. If recording thermometers, pressure gages, draft gages of CO₂ recorders are wanted, the cost increases somewhat, and such recording instruments might or might not be needed, depending on the size and condition of the boiler plant. In any case after the output divided by input is established it is a comparatively easy matter to figure whether it will pay to put in more expensive instruments.

I have been using 65 per cent efficiency, not because this ought to be considered as a standard, but because it was about the best that could be obtained as a monthly average before any instrument was installed to guide the fireman, and therefore the fuel saved above 65 per cent efficiency represents a clear profit less the interest and maintenance of the instrument and the bonus paid to the men. This figure is very conservative, and as far as saying *how* the better results can be accomplished and supervision are operating at an average as high as 65 per cent efficiency, and therefore in many cases the net saving will be considerably higher than here taken.

BONUS SYSTEM FOR THE SAVING OF COAL ¹

Many easygoing owners and managers of plants, realizing that the actual performance is falling short of that possible, often shift the responsibility from their shoulders to those of the employee by offering a premium for performance which is sufficiently better than the present, leaving it to the employee to secure the "better results." In such cases the management side-steps its duty in not saying *how* the better results can be accomplished and *what* they shall be. Such methods are sometimes advocated as giving the employee freedom to develop his

¹ By Walter N. Polakov, Consulting Engineer, New York City. Electrical World. 71 : 36-9. January 5, 1918.

ingenuity. This sophistry is easily exploded when it is considered that the operating man seldom has time for investigation and researches. His hands are full keeping the wheels turning. Furthermore, measuring and indicating instruments and devices are often lacking. The peculiar requirements of a research man—highly developed power of abstraction and observation, ability to concentrate on one problem to the exclusion of all others—are faculties which are seldom, if ever, found in men engaged in routine operating work.

MANY BONUS PLANS UNSATISFACTORY

It is generally conceded that higher efficiency warrants higher compensation and that stimulation for efficient work is necessary for its perpetuation. However, the lack of careful study of the subjects is responsible for many misconceptions. Most of the methods of extra compensation are unsuitable, yet no better plan can be adopted unless the principles and operating conditions are properly organized. The faulty methods may be classified as follows: (a) Profit-sharing plan; (b) premium schemes, and (c) rewarding individual efforts.

Profit-sharing.—Profit-sharing is based on the assumption that the employees by their work contribute to the success of the enterprise in securing profits. This would be entirely correct if the employees had the opportunity to control all functions of management, fix the salaries of directors and direct purchases and sales, besides having a veto in financial transactions. As long as they are expected, however, to work under the conditions provided by the management, with equipment and material furnished by the management, which in turn disposes of the product, the profit or loss is only slightly influenced by the excellence of the work done by the men. If dividends are not declared, the workmen lose their share, perhaps through no fault of their own, since even if they have been working as hard as possible, blunders

in policy and mismanagement will offset any good they have done.

Premium Plans.—Premium plans, as worked out in power plants, are very unsatisfactory. The common error of all the attempts in this line is that the final cost of operation is considered as a basis for the award or denial of the premiums. Yet it is perfectly clear that the cost depends not only on the excellence of work but equally, if not in a much larger degree, upon the method and means of upkeep, cost of fuel and supply and its quality, quantity of output, load factor, use factor, etc. None of these factors is under the control of the power-plant employee. Besides, the extent to which different employees contribute to the attainment of economical results is very unequal. While the firemen may effect as much as 50 per cent saving, the switchboard operator cannot influence more than, say, 5 per cent, whereas the floor engineer can save or waste about 1.5 per cent at the most.

The unsuitability of the premium plan was forcefully demonstrated several years ago in a plant where employees who had been accustomed to earning premiums were unable to do so any longer owing to the use of poorer coal and a reduction in load.

Rewarding Individual Effort.—The rewarding of individual effort is perhaps the most unscientific scheme of all. The same objection exists that was cited before—the responsibility for securing better results is shifted onto men who have no authority to alter the conditions under which they are expected to produce results. The common error in applying the reward is to select arbitrarily one or more isolated factors, like CO₂ in flue gas, carbon in ashes, etc., and reward men obtaining the best results. It is generally overlooked that any one or several of these factors do not indicate the true performance of the whole process. It is often wise to lose in one direction in order to gain more in the final result. Moreover, it is absurd to request men to secure better results

without teaching them how to do it and without providing them with instruments showing the progress made.

If one of the advocates of these short cuts would take pains to investigate any of his hobbies—whether high CO_2 , or low flue temperature, or good ashes, or anything else that can be produced—he would find that the relation of the factors is complex enough to warrant detailed study. Furthermore, good results cannot be expected unless the equipment used is maintained in first-class operating condition and the supplies furnished are the most suitable and of uniform quality.

A glaring example of inconsistency of the individual-reward plan is offered by the experiences of a Western railroad. Here it was recognized that the actual performance was worse than that possible, and that local conditions of various plants called for different standards.

The work of establishing standards of performance was based not on actual experiments but on average statistical data of the past, reduced by the guessed percentage suspected as waste. Then an allotment was made for each individual plant as to how much fuel should reasonably be consumed there per month. Similarly, payrolls were revised and certain labor costs were assumed as reasonable. These two records multiplied by constants arbitrarily chosen (6 for fuel and 4 for labor) added together and divided by 10 gave the figure of merit used as a basis for the payment of bonus, the bonus itself being adjusted on a sliding scale.

The shortcomings of this crude method are apparent:

1. Men are left to discover for themselves how to secure the results desired by the management.

2. The management, shifting the responsibility to the men, was uncertain as to the exact amount of saving accomplished due to individual efforts, and therefore could not fix a definite bonus.

TASK-SETTING PLAN THAT BRINGS RESULTS

As opposed to all these methods, the writer advocates the assignment of a well-defined task to each member of an organization. The setting of a task presupposes the complete and detailed knowledge of each and every process performed in the plant and includes reliable information as to what each unit of equipment can do and what are the conditions producing the desired results. This knowledge, once gained through test and research work, is made available by instructions and training. Results necessarily follow conditions; therefore the task really consists in maintaining conditions as prescribed, not in attaining results, inasmuch as they are assured if all requirements are complied with.

To determine whether the men live up to their instructions, and consequently whether they earn their bonus, it is often convenient to judge by final results. However, these are not necessarily definite indications, since results may fall short of predetermination because of conditions beyond the control of the employee. To illustrate: Boiler efficiency may materially drop through no fault of the fireman if baffles and arches in the boilers are not maintained, owing to poor planning, lack of material, etc. Steam consumption may increase above what it should be if cool condensing water is not available. The man may fail to remove the ashes in the prescribed time if the locomotive batteries are not properly charged, the cleaning schedule disorganized, etc. It would be obviously wrong to deny the bonus to the employee who did all that was expected of him but who was unable to produce results through the fault of somebody else or something that could not be prevented by him.

Under such conditions an investigation should be made, not to verify the results, but to find out whether the conditions prescribed by the instruction card were lived up to. If they were, that is all that was expected from

the employee and his bonus should be allowed him. This basic principle should apply in all cases. Favorable conditions may produce results slightly better than specified, yet they do not call for any additional reward since they evidently are not due to any extra work on the part of the employee. In other words, the bonus remains constant as long as the terms of the instruction card are complied with, irrespective of whether the results are equal to, above or below a certain predetermined value. In case results are below a specified mark the bonus should be paid in full or not paid at all, depending on the investigation previously mentioned, but never should the bonus be reduced.

The knowledge of how to do things properly and the strongest desire to work according to the best methods are of no avail unless the conditions are such that it is possible to apply these qualifications. It is a well-known fact that the daily performance in a plant operating under old-fashioned management falls short of the results obtained during a specially arranged test. This is due chiefly to the failure to plan the work ahead and permanently maintain the conditions prevailing during the test.

In considering conditions which should be maintained to secure the best economy the elimination of causes producing fatigue should be given first rank, as in power-plant work neither the best of machinery nor excellent supplies can produce satisfactory results unless they are handled by men who are not tired, mentally or physically. From experiments conducted with firemen the writer has found that, other conditions being equal, a fireman on a twelve-hour watch is about 4.5 per cent less efficient than the same man on an eight-hour shift.

No one familiar with the common layout of a power plant can over-emphasize the importance of hygienic conditions to enable men to live up to their task day in and day out. While engine rooms not infrequently offer very pleasant and sanitary surroundings, boiler-houses, the most important part of any plant, are often so built

as to make them unbearably cold in winter and uncomfortably hot during the summer. Good lighting is so unusual that after looking into the furnace a fireman can seldom read the gages or examine anything around the boiler. Good drinking water is rarely provided, and restful seats with backs (seats without backs are as bad as no seat at all) have never been found by the writer in any boiler house. If provided with seats having backs the firemen can clean the fires twice as rapidly as without them.

The absence of elementary conditions of comfort in a working place where the men spend the greater part of their lives is more harmful to the employers than to the employees. Petty annoyances and feelings of discomfort divert the attention of the men from the performance of their duties to means of avoiding the annoyance. Steady attention on the part of the firemen is much more important than is generally realized.

Of no less importance is the hygienic surrounding on the switchboard gallery. Flickering light from lamps on a low-frequency circuit, glare on the glass fronts of instruments, cement floors to walk on, inconveniently located telephones or telautographs, too low log desks, etc., are all excellent means to increase steam consumption per kilowatt-hour and reduce the safety to men, property and service.

BONUSES IN A SHOE FACTORY

The F. Mayer Boot & Shoe Co. Milwaukee, Wis. has a bonus plan for economy that has been in operation since 1914. The plan applies to outside cutters, trimming cutters, and sole leather cutters. Under the plan, three cents is paid for every foot of leather saved by the cutters under their allowance. A charge of the same amount per foot is made for losses. The cutters are paid when their savings amount to \$10.

CHAPTER IX

BONUS FOR STEADY ATTENDANCE

THE PROBLEM OF LATENESS AND ABSENTEES ¹

REVIEW OF METHODS USED IN VARIOUS FIRMS

THE COST

The cost to business firms, occasioned by absences and tardinesses is much greater than generally realized. One department store reports that it is required to keep 5 per cent more employees than would otherwise be necessary, because of absences and tardinesses of employees. Perhaps the three most important costs are:

1. Maintenance of larger payroll.
2. Idleness of machines and equipment when not in use.
3. Impairment of discipline and control.

INCREASE SINCE 1916

These twin evils have greatly increased since 1916, due to the abnormal conditions of employment which prevailed during the war. The fact that the "fear of discharge" practically disappeared from the minds of many employees greatly weakened discipline in many plants. Hence there was a "letting down of the bars," a tolerance and indifference toward undesirable traits in employees, and a general laxity in control which greatly increased absences and tardinesses, as well as minor infractions of rules and regulations (which also lessened production).

¹ Special Supplement to Industrial Relations. January 15, 1921. Vol. V. No. 13. Copyright 1921. Meyer Bloomfield and Daniel Bloomfield—All rights strictly reserved.

THE PRESENT PROBLEM

In the present period of readjustment, it is important to ask, "What measures can be taken by the management to lessen the waste occasioned by unduly frequent absences and tardinesses?" Certain methods which have been successfully used, by various firms, will be considered in this report.

PAY DAYS

Many firms report that absences have proven to be greatest on Mondays. The term "Blue Monday" has frequently been used to indicate the unsatisfactory character of this day in many plants. To lessen causes, which produce such results, many firms have done away with the Saturday pay day—and now use Tuesday, Wednesday or Thursday for paying wages.

TRANSPORTATION DIFFICULTIES

In many cases, transportation difficulties prove to be a most important cause, particularly for tardinesses. Traffic tie-ups, delayed cars, and similar factors entirely beyond the employees' control frequently result in tardiness, despite his best efforts. To meet this situation, certain establishments have adopted the policy of employing *only* those employees who reside in certain stipulated geographical areas, which offer reasonably reliable transportation facilities, to and from the place of employment. Thus an effort is made to give preference to those applicants who do not come from an unduly long distance, and who are not required to make a number of transfers or charges while en route, etc. One of the department stores of Chicago has tried this plan with success.

"DOCKING"

The practice of docking the employees' wage for absences and tardinesses is not a new one. Ordinarily, employees who are working on hourly- or daily-wages are automatically docked for their *absences*, although in

many cases, not for their tardiness. Likewise piece-rate workers are automatically docked for time lost. However, in many cases, there is an attitude of indifference among piece-rate workers on this subject, because they feel that "their time is their own." For them, therefore, the docking system is of little value. Hence, when used, it is ordinarily applied to salaried or time-rate workers, *especially* in connection with tardinesses.

VARIATIONS OF THE DOCKING SYSTEM

There are many variations of the fining or docking system.

The Cleveland Metal Products Company provides that if an employee is late any fraction of fifteen minutes, he is docked a *full* quarter of an hour wage. This applies to both day- and piece-workers. The piece-workers are "docked" on the basis of their day work-rate and not their piece-work earnings. Many other firms follow a similar practice.

DISADVANTAGES OF DOCKING

The "docking system," however, has certain disadvantages. At best, it is a negative method, not a positive one. It frequently arouses the employees' resentment, particularly if he is docked, say, a quarter or a half hour's pay, because he is late a fractional part of such period.

OVERCOMING SUCH OBJECTIONS

Some firms endeavor to overcome these objections to the "docking system by providing that the money so saved shall not go to the employer, but that it shall all accrue to a *special fund*, to be used exclusively for certain employees' educational, club, or recreational activities." The Art in Buttons Company has such an arrangement. When thus modified, the docking system loses much of its sting to the employee, although it remains just as effective in the accomplishment of its main purpose, i.e., the reduction of tardiness.

BONUS AND PREMIUM PLANS

As contrasted with the method of levying fines, other firms use special bonus plans offering special rewards for punctuality and regularity of attendance. Such plans are *positive* rather than *negative*. They offer the employees a special *inducement* and *incentive*, over and above the regular pay.

CASH BONUS PLANS

For example:

The O. W. Richardson & Co. (furniture, rugs, etc.), of Chicago, pays a 2 per cent bonus on every semi-monthly pay day to all employees who have had a perfect attendance and punctuality record, during the semi-monthly period.

The A. J. Nystrom & Company, of Chicago, provide a theater ticket on each monthly pay day for those employees who have been neither tardy nor absent more than five times during the month. The winners all attend the same theater in a group. This monthly "theater party" is one of the important events in the social life of the employees. (At first, the selection of the theater was left to the vote of employees. But such marked differences of opinions developed that the management now selects the play.)

The company also has a profit-sharing system, but that is not affected by the tardiness of employees, although payments are reduced by paid absences.

The International Silver Company of Bridgeport paid a 5 per cent weekly bonus on wages, for a perfect time record during the war.

The Procter & Gamble Co., Ivorydale, O. pays a bonus of \$2 per week to its female employees for perfect attendance.

To encourage punctuality and good attendance, the

Metropolitan Life Insurance Co. pays a bonus of 10 per cent of the weekly salary to any Home Office employee who completes thirty consecutive business days of perfect attendance. The maximum payment is \$6. Vacations and absence due to a process of a court or to military duty do not forfeit the bonus, but do not count for it.

ATTENDANCE BONUS FOR ELEVATOR MEN

A. I. Namm & Son, Brooklyn (department store) offers to elevator operators as an incentive to regular attendance one-half day's pay or the equivalent time for perfect attendance for one month. Operators are given their choice of time or pay whenever possible, although occasionally the store is unable to allow time. The employees generally choose pay. This bonus has had excellent results.

SPECIAL REWARDS OTHER THAN CASH PAYMENTS

The special rewards offered are not *always* in the form of a cash bonus. For example:

The S. W. Collins Manufacturing Company provides that every woman employee who loses not more than ten days' time during the year may have one week's full vacation, *with pay*. Thus, the employees get an opportunity to take a vacation, which, the management holds, greatly increases their efficiency, and at the same time the inducement for *regularity* throughout the year is provided.

SPECIAL PLAN OF UNITED CHEMICAL AND ORGANIC PRODUCTS

Perhaps one of the most interesting and novel bonus plans is that introduced by the United Chemical and Organic Products Company of Hammond, Ind. This concern uses a bonus based upon two combined factors, (a) length of service; (b) hourly-rate.

In this way the employee drawing the higher pay will receive a greater bonus. This has the effect of encouraging the men to reach the point where they can command

a higher rate of pay. The causes for penalty through which the employee loses his bonus during the current pay period are tardiness and absence from duty without valid excuse.

The bonus consists of a graduated percentage, to be paid upon the employees' earnings, for each semi-monthly period. This percentage is in an *increasing* ratio, increasing as the period of service increases.

However, the *only* periods of service included in the computation of the employees' period of employment (to be used as a basis for their bonus) are those periods during which he has had a *perfect full time record*. Thus, if an employee has been on the payroll seven months, but if during that period he had an *imperfect* or *part time* record for two semi-monthly periods—his bonus would be computed on *six months only*. In other words, each time a worker turns in a perfect record for the semi-monthly period, one-half month is added to his period of service, upon which his *length-of-service* bonus is computed. But, if he has had an imperfect record during any semi-monthly period, that period will not be added to his record.

If a worker does not have a perfect full time record, for any semi-monthly period, he sacrifices his bonus for that period, but he does not lose the credit of his previous service, as the basis for *future* length-of-service bonus payments. That is, all perfect full time periods previously served will stand to his credit, in computing future bonuses. The above plan is well designed to promote both *regularity* and permanency among employees.

MAKING TARDINESS CONSPICUOUS

Entirely aside from levying penalties, or offering special bonus rewards and similar plans appealing to the employees' desire for personal gain, other methods have also been found effective. Some managers hold that the most effective method of reducing tardiness is to make lateness

difficult, conspicuous and embarrassing to the tardy employee.

For example:

The J. B. Stetson Company requires that if an employee is late he must get a specially signed pass to be admitted to the plant.

Strawbridge & Clothier Company of Philadelphia provides that if an employee is late he must first go to a central desk, sign up, and indicate the number of minutes he is late.

These plans have the advantage that the employee realizes he must call attention to himself, and to his tardiness. He knows full well that it will not be possible for him to enter late and yet have his tardiness pass unnoticed and unobserved.

One of the above firms reports that tardinesses were reduced about 25 per cent by the use of such a plan which made every tardiness conspicuous and embarrassing by calling the specific attention of the employee's superior to it.

MAKING EMPLOYEES REALIZE THAT THEIR ATTENDANCE RECORD IS IMPORTANT

There can be little doubt that one of the most effective means of overcoming these twin evils is to let the employee know and understand that such delinquencies do not pass unnoticed, and to make him feel that *real importance* is actually attached to his attendance record. This can be done in various ways.

The S. M. Collins Manufacturing Company accomplishes this result by keeping a card record showing the total number of hours the employee could work, per week, if he is actually on the job throughout the entire week, and also showing the *actual* amount of time worked. The difference, expressed in terms of hours and minutes, represents the time lost due either to the employee's absences or lateness. Every employee is instructed

that his attendance chart will be given careful study in considering every advancement and promotion, either in responsibility or in salary. Hence, this method has proven a very effective one, particularly among the more ambitious employees, who look forward to securing advancement.

The Emergency Fleet Corporation tried to promote the same end among office, clerical and salaried employees, by keeping a careful record of the employees' attendance (both absences and tardinesses.) Every two weeks each employee's record was placed on his desk by the department head.

Such methods go far to make the employee feel that his attendance record is important, that his superiors *know* what his record is, and that they *care* what it is. In other words, he feels the pressure and influence from those further up in the organization. With many employees this is likely to be the most powerful consideration.

RIVALRY AND PUBLICITY

A certain amount of educational work may be accomplished by developing the spirit of inter-departmental competition and rivalry, and by publicity. For example:

The Curtis Publishing Company of Philadelphia follows the practice of posting bulletins, showing the number and percentage of absences and latenesses, by departments, and the relative standing in this respect of each department.

The company goes further by reporting to the Personnel Committee the total list of workers who have been tardy over three times during the month, and then this list is sent back to the Division Head with instructions to follow up personally and exert pressure to better the record the next month. If the record is not bettered, then the Personnel Manager and the Division Head are made jointly responsible for whether the employee is to be maintained or not.

Strawbridge & Clothier of Philadelphia go even further. Each Department Manager is advised weekly of the relative standing of his department in punctuality with the names of those responsible for imperfect records. Persons frequently tardy are summoned for interview in the Department of Personnel. Attendance and tardiness are entered on the employee's record and become factors in the employee's progress.

EMPLOYEES' SERVICE WORK

Certain forms of employee's service work have been found helpful. Among these many be mentioned home visiting and nursing. Certain firms employ a visiting nurse, who looks up every absentee, on the second day of absence. In many cases, the absence is found to be due to sickness of the workman, or perhaps due to sickness of his wife or child. By securing or providing the proper care, the nurse is frequently able to get the employee back to work shortly, or at once,—thus materially reducing the period of his absence.

The Cleveland Metal Products Company, Hart Schaffner and Marx, The Merchant Shipbuilding Corporation, and other firms have tried this plan with substantial success.

Other firms maintain a staff of doctors and dentists, *in the plant*, and provide that employees consult them *freely*, on the company's time.

Montgomery Ward & Company of Chicago had such an arrangement. The management reports that in this way many minor complaints, sicknesses, colds, etc., are "*nipped in the bud*" by early and preventive treatment,—which, if permitted to go unattended, would result in prolonged illness, and therefore, in prolonged absences from work.

Vigorous "safety first" campaigns also result in a substantial reduction in absence. For, by such means, employees are educated and enabled to avoid, or at least to reduce the number of industrial accidents, which necessarily cause men to absent themselves from their work.

100 PER CENT ATTENDANCE RECORD

Most of the bonus plans above described insist upon 100 per cent attendance record, with regard to absences—or tardiness—or both. However, some companies allow a certain margin. For example, one Chicago plant bases its bonus payment upon a 95 per cent attendance record. Some establishments (e.g., A. M. Collins Manufacturing Company) do not count absences against the employee's record, *provided* he brings a physician's statement showing illness as the cause. But in most bonus plants there is no such special provision.

BULLARD MACHINE TOOL COMPANY PLAN

The Bullard Machine Tool Co., Bridgeport, Conn., has a plan for giving a premium or bonus to employees for prompt, regular and continued service. This premium amounts to 10 per cent of the employee's weekly wages, earned during the regular hours of operation, provided the employee has worked a full week, but this 10 per cent premium will not be paid on overtime.

Premium vouchers are enclosed in the pay envelope on each pay day. Each premium voucher becomes payable four weeks after issue, provided the person receiving the voucher is still in the service of the company.

These premium vouchers are not negotiable, cannot be transferred, and become void if the person named thereon leaves the employ of the company for any reason.

The company reserves the right to change or discontinue this plan at their option. But should the company discontinue the system, it will honor all valid outstanding vouchers and cash them at maturity.

ABSENCES—HOW TO REDUCE THEM ¹

Those who have accomplished the best results in reducing absenteeism put the most faith in prompt

¹ From Factory. 21 : 231-2. August, 1918.

investigation of all cases of absence. Just how this is to be done economically and with due regard to the psychological aspects of an interview with absent employees is something of a question.

One New England company sends out a rough and ready factory man to do the investigation work—not a polished office clerk. The management here believes that this man is better received in the homes of workmen than would be an office investigator.

To expedite the work this man has an automobile at his service. He looks up those cases to which he is directed by the attendance clerk of the employment department.

Another New England company—a Massachusetts concern—has its absentee investigation work carried on by its hospital nurses. They go to the homes of absent employees to offer assistance to any who are ill. Incidentally they bring back full records of the case.

It is thought that the psychological effect of having a nurse attend to such cases is good, for obviously no well person who stays out for trivial reasons other than those of health cares to have a nurse appear to inquire for him.

A report of absentees is furnished the labor and service department at 8:15 every morning.

At 8:30 the service auto leaves the plant with a service worker who checks up each individual, noting on a special report, which is used for that purpose, the record of the absentee.

The service auto returns to the plant at 12 o'clock and the reports of the morning's visit are handed to the superintendents of the divisions for their information. As the majority of the workers are girls, the service worker endeavors to reach the parents of the operator and, when possible, to learn of any complaint or dissatisfaction.

OTHER WAYS OF CHECKING UP ABSENTEES

Some companies rely on the telephone where possible and still others on the mail to check up absentees. In

other cases, absentees are required upon their return to state to the foremen the reasons for their absence, but this to many may seem like locking the barn after the horse is stolen.

There is an interesting variation of this practiced at the plant of the Avery Company. When an absentee gets back on the job at this plant he must report to the company doctor before he can go to work. This has had a good effect in bettering the attendance records and has been particularly beneficial in reducing after-pay-day absenteeism. Men know better than to face the experienced doctor with an excuse about too much pie and an upset stomach when indications are otherwise.

Some concerns pay attendance bonuses and in these cases a smaller amount of investigation of individual cases is attempted as it is assumed that under these conditions all will come who are able. But more about the attendance bonus later.

A too early investigation of absence cases will call for an unnecessary amount of labor, so that most companies, particularly the larger ones, who do work of this sort begin investigation only after an interval of two or three days.

The investigation of absences does far more than merely strengthen lax habits on the part of employees. It often enables the management to keep in better touch with its working force and thus learn from them more of the workmen's viewpoint upon their organization, for many stay away on account of dissatisfaction rather than illness.

Concerning this the employment manager of the Columbia Rope Company says: "Naturally we find cases for which they have a perfectly reasonable excuse, and there are those who are dissatisfied. With those who are dissatisfied we make an effort to have them come back to the office to talk matters over and see if we can make arrangements that are satisfactory to them. We are able to do this in a great many cases."

Tardiness, while it does not slow up production to the same extent that a whole day's absence does, is detrimental to the morale of the working force and of course represents idle machine time in the case of machine operators. And so absence and tardiness are often considered together, although their treatment in general may not be the same.

But the bonus method seems to be admirably suited to the reduction of both absenteeism and tardiness. So great is the importance today of keeping everyone at work all the time that rather large attendance bonuses are offered by some companies.

Such bonuses range all the way from small rewards up to 15 per cent of the salary. But of the ten or eleven attendance bonus plans, the complete details of which were at hand when this article was written, the average bonus is more than 8 per cent of the wages. How large the bonuses given are in a number of companies the table on following page shows.

It may be interesting to go into the details of some of these plans. At the Yawman and Erbe Manufacturing Company, employees receive a war bonus as follows: All employees earning \$15 or less per week, 15 per cent; over \$15 but not over \$20, 12½ per cent; over \$20 but not over \$30, 10 per cent; over \$30 but not over \$50, 5 per cent.

These bonuses are paid each employee working the full number of regular hours. For a less number of hours, or not reporting on time for work, deductions from the bonuses are made as follow: For either once late or once absent during any one week the bonus percentage is reduced by 2 per cent.

THIS IS AN EXCEPTIONALLY LIBERAL BONUS

For late once and absent once during any one week the bonus percentage is reduced by 5 per cent.

For either twice late or twice absent during any one week, the bonus percentage is reduced by 5 per cent.

SAME BONUSES PAID FOR GOOD ATTENDANCE RECORDS

NAME OF COMPANY	ATTENDANCE BONUS	ATTENDANCE BONUS PERIOD	SERVICE BONUS	REMARKS
The Robbins and Meyers Company	5%	2 weeks	1½% at 6 months up to 10%	
The Goodyear Tire and Rubber Company	10%	—	After 5 years, one week vacation with pay After 10 years, two weeks vacation with pay	
Westinghouse Lamp Company	10%	1 week		
Columbian Rope Company	7%	1 week	1% per year of service up to 5 years	
Steel Equipment Corporation	5% 10% additional	4 weeks 6 months		
Findeisen and Kropf Manufacturing Company				
Office employees	\$1.	2 weeks	After one year, two weeks vacation with pay and 5% of earnings	
Brass shop men	5%	6 months	After six months continuous service 7½% of earnings	
Brass shop women	\$1.	2 weeks	After six months continuous service 7½% of earnings	
Yawman and Erbe Manufacturing Company	5% to 15%	1 week		Note: Sliding bonus percentage depending on earnings and deductions for minor irregularities in attendance. See text.
Queen City Machine Tool Company	\$0.50 to \$1.25	1 month		Note: Paid in Thrift stamps

For either three times late or three times absent during any one week, the bonus percentage will be reduced by 10 per cent.

For more than either three times late or three times absent during any one week, the employee is disqualified for bonus during that week.

Each day or part of a day absent figures the same as each occasion late.

Employees who are absent, due to injury received in the performance of their regular duties, do not forfeit any portion of their bonus due to such absence.

Any employee leaving the service of the company, between the dates when bonuses are payable, forfeits any bonus that may have accumulated during that period, with the exception that employees who may have enlisted in the army or have been called to the colors, will receive their bonus on leaving the employ of the company.

A Cleveland concern is about to institute a plan which contemplates the division of its organization into its departmental units. It proposes to offer a day's wages per month to the employees of the department obtaining the best percentage record for attendance.

USING TEAM WORK AS A BASIS FOR BONUSES

By putting the competition on a percentage basis, opportunity between the large and small departments is equalized. This concern under this plan it not to accept any excuses, but simply allows the time cards to determine the standing. It is the belief of this organization that the element of team play will bring satisfactory results.

With a plant having many departments, it may be said by some that the chances of winning are so reduced for the individual that the plan may not offer sufficient incentive to get good results.

Perhaps the plan having the maximum incentive for

workmen is that in force at the plant of Steel Equipment Corporation.

There are two plans. Plan No. 1 provides a bonus of 5 per cent to be paid every fourth week. The amount of extra pay is figured as follows: If the employee is present every day and on time during the four weeks he receives an extra amount equal to 5 per cent of the wages he has earned during that period. If he is late or absent only one time during the four weeks he receives extra pay of 4 per cent. If late or absent twice during the four weeks he receives extra pay of 3 per cent. But he receives no extra pay if he is absent or late three or more times. New employees participate in the plan commencing with the first new four weekly period after their employment.

Plan No. 2 is an entirely extra reward and has nothing to do with the reward paid under the above plan. The bonus covers a period of twenty-six weeks. No lateness or absence during this period entitles the employee to a bonus of 10 per cent of his entire earnings for the entire period. For example: If an employee's earnings for the twenty-six weeks were \$520 his extra pay or bonus would amount to \$52.

If the employee has not been late or absent more than five times during twenty-six weeks he receives extra 8 per cent (41.60). If not late or absent more than ten times he receives 5 per cent extra (\$26). If not late or absent more than fifteen times he receives 3 per cent extra (\$15). The bonus is paid thirty days after the twenty-six weeks have expired. An employee discharged for any cause does not receive Bonus No. 2. This also applies to employees who leave of their own accord. In cases of death, all accumulated bonuses are paid to the family or heirs of the deceased.

The maximum bonus in this particular case is large but it does not seem so big if it is looked at as a raise in wages, which might come anyhow; but it is more than a simple wage increase as it is conditional upon good

attendance. And all attendance bonuses that do not immediately follow wage increases may be looked at in this same light.

The bonus for perfect time records is 5 per cent on each pay period of two weeks at the Robbins and Myers Company. Hence two weeks' perfect attendance, including promptness, is required in order to bring the bonus with the pay check. In addition a graduated bonus for long service, beginning with $1\frac{1}{2}$ per cent at six months and going up to 10 per cent operates toward keeping men regular enough in attendance to hold their jobs, even though they may not be able to get the 5 per cent attendance bonus regularly.

Another combined service and attendance bonus with interesting features is that in the brass shop of Findeisen and Kropf Manufacturing Company. Both men and women (except department heads) are paid a service bonus of approximately $7\frac{1}{2}$ per cent of their earnings at the end of each six months' period of continuous employment.

The attendance bonus is different for men and women in this company's employ. Every man employee who has lost not more than thirty hours of the working time of his department during his six months' service bonus period also receives an attendance bonus of 5 per cent of his earnings during the six months.

For women an attendance bonus of \$1 is given for each perfect two weeks' attendance. The loss of one hour of working time during the two-week period will forfeit the bonus.

At this plant in case it should be necessary to lay off any employee permanently he is paid full bonus up to the time of lay-off. In case of temporary lay-off the department head fills out a pass in duplicate specifying the date and length of time the employee is to be laid off. One copy of this pass is retained by the department head and one by the employee which serves as a proof that this lost time is not to be considered an absence.

NEW WAY OF GETTING PERFECT ATTENDANCE

The employee's first attendance bonus period is for three months only. Subsequent periods are of six months' duration.

A novel form of attendance bonus is that in force at the Clothcraft Shops of the Joseph and Feiss Company. It is the custom at this plant to close down for one week each year. This vacation for the employees is without pay, but after working for the concern for a year employees get a bonus equivalent to forty-eight hours of work. Each absence of one day when not covered by a sufficient excuse takes off eight hours from the forty-eight-hour bonus.

At the Westinghouse Lamp Company, where an attendance bonus is in effect, the bonus is paid on a weekly basis. For the salaried employees who are paid twice a month, one late in the fifteenth-day period disqualifies them for 50 per cent of the bonus and if the late is over fifteen minutes they are disqualified for the whole bonus.

One variant of attendance bonuses is to pay them in thrift and war savings stamps, as is done at the Queen City Machine Tool Company. This plan, besides assisting the government, has the advantage of stimulating the habit of saving.

The trouble with the individual bonus for attendance as one executive sees it is that in individual cases there are a great many legitimate excuses and the just settlement of excuses alone is apt to be burdensome. Furthermore, it brings one more point of friction between management and employee, as this executive puts it.

Perhaps it is for this reason that in many plants hard and fast rules govern excuses so that a man two seconds late is late. In most cases there are certain standardized excuses or exceptions allowed. For instance, most companies having attendance bonus plans make due allowance for late trains or a general tie-up in the street car service.

Record keeping of attendance probably pays even though no attendance bonus is in force. In fact, its value in assisting in the just handling of wage increases may alone warrant the keeping of these records. In the questionnaire which formed the basis of this article, with one exception every executive said that the absentee record was a prominent factor in determining upon individual wage increases. And, in fact, in this exception mentioned, the writer said that to a limited extent he took the absence record into account. He added, "The nature of work performed, and ability of the worker, are naturally paramount in considerations of this kind "

But even if the records are not taken into account in granting raises, the moral effect is good. If a workman knows that every absence is a matter of record he is less likely to be thoughtless about taking days off. The record has value if it is incorporated in letters of recommendation when workmen leave a company's employ, particularly if the whole working force appreciates that this custom is being followed. One executive believes that this alone is a powerful incentive to have a clean record.

WHY ONE MANAGER DOESN'T BELIEVE IN THE ATTENDANCE BONUS

As has been pointed out, the keeping of attendance records does not imply the necessity for an attendance bonus. In fact, one employment manager who has an exceptionally complete attendance record feels that a bonus is equivalent to bribing children to be good by giving them candy. He asks, "Why pay extra for what is understood to be in the contract in the first place?"

Perhaps the whole situation is summed up by A. W. Ross of the labor and service department of the Westinghouse Lamp Company who writes, "The bonus scheme should only be used in plants where tardiness is a factor. To institute a bonus scheme based on punctuality and attendance, in a plant where there is very little of this

trouble, would very soon disorganize a well-regulated plant. This is based on figures which we have obtained from one of our other plants, and it can be said that an employee losing the bonus on Monday morning will invariably be late again during the week, knowing as he does that he has lost the bonus and does not care about punctuality thereafter."

CHAPTER X

BONUSES FOR LENGTH OF SERVICE

COST OF A SERVICE BONUS PLAN

GENERAL MOTORS CORPORATION

The General Motors Corporation awarded in July, 1921, to 6,577 of its employees 6,332 shares of the 7 per cent debenture stock and 117,552 shares of the common stock of the corporation as bonus for the calendar year ending December 31, 1920.

The bonus plan was adopted in 1918 as a solution of the problem of how employees of exceptional merit might be induced to remain with the corporation for a period of at least five years. This profit-sharing plan is also substantial recognition of the fact that in a marked degree the success of the corporation may be attributed to the inventions, ability, industry, service and loyalty of its employees.

Years ended Dec. 31	No. shares common awarded	No. employees receiving common	No. shares 7% deb. awarded	No. employees receiving 7% deb.
1920	117,552	3,210	6,332	3,367
1919	214,659	1,721	14,088	4,709
1918	261,460	2,277		
Grand Total.	593,671	7,208	20,420	8,076

A PROFIT-SHARING PLAN

Employees, by the operation of the plan, are made partners and part owners in the business and thereby encouraged to further effort and initiative. It is the intention to continue the plan year after year, the right

being reserved, of course, to modify or repeal the plan at any time; however, a bonus once granted an employee cannot be recalled or modified.

The annual awards under the bonus plan are held in trust for the employee for a period of five years, but during that time dividends are paid direct to the employee. The awards for the three years during which the plan has been in operation is shown below.

10 PER CENT OF EARNINGS USED AS FUND

The corporation each year, after deducting from net earnings 6 per cent on the capital employed in the business, sets aside 10 per cent of the remaining net earnings and this amount of money is placed in the bonus fund, which is invested in the common and 7 per cent debenture stock of the General Motors Corporation. The total amount of money set aside out of earnings in the three years, 1918, 1919 and 1920, with which to carry out the bonus plan work is in excess of \$13,000,000, and this does not include the expenditures of administration.

ADMINISTRATION OF BONUS PLAN

Bonuses will be awarded in either one or more of the following classes:

1. "Senior" bonuses may be granted in the following manner:

The senior bonus list will be selected from those salaried employees receiving \$2,400 per year and upward; provided, however, that to receive or retain a senior bonus rating the head of division or other superior officer must certify each year that the individual is one who is a high class man, showing, (or showing promise of) more than ordinary ability in an individual or supervisory way, capable in his position and not easily replaceable should he leave the corporation's employ.

A senior bonus list will be made up of the more important salaried employees, to whom may be distributed in accordance with provisions herein contained of not

more than from 8 per cent to $8\frac{1}{2}$ per cent of the surplus left from earnings after deducting 6 per cent on the capital invested.

Recognizing that extra compensation should vary as between individuals, the president and each head of a division will at the end of each calendar year furnish a list of his salaried employees coming within the terms of this section, classifying them into the following groups:

- AA—President's list,—including the heads of divisions and all salaried employees not under the direction of a head of a division; also in extraordinary cases other employees, upon the recommendation of the heads of divisions and with the approval of the president, may be transferred to this class;
- A—Division employees of the highest type, but not necessarily of the highest salaries, and containing names approximately aggregating 10 per cent of the total salaries remaining on the division bonus list after the elimination of those individuals who do not come within the qualifications necessary for bonus distribution.
- B—Division employees of the next highest type to the extent of approximately 15 per cent of the aggregate amount of salaries on division bonus list;
- C—Division employees of the next highest type to the extent of approximately 15 per cent of the aggregate amount of salaries on division bonus list;
- D—Division employees of the next highest type to the extent of approximately 15 per cent of the aggregate amount of salaries on division bonus list;
- E—Division employees of the next highest type to the extent of approximately 20 per cent of the aggregate amount of salaries on division bonus list.
- F—Division employees of the next highest type to the extent of approximately 25 per cent of the aggregate amount of salaries on division bonus list.

When all of the names on classes, A, B, C, D, E, and F are in hand and approved by the Bonus Committee with such modifications as it may determine, the Finance Committee will declare by resolution the rate of percentage, as applied to each employee's salary, which will be allotted in stock to each classes A, B, C, D, E, and F and to the individuals named in class AA.

2. "Junior" bonuses may be awarded to all other employees on the recommendation of the head of a division

approved by the Bonus Committee, the amount of each award not to exceed one-half of the annual compensation of the recipient. Junior recipients should be employees who are "intelligent and earnest workers, capable in their positions and not easily replaceable should they leave the corporation's employ."

(a) The amount available for junior bonuses shall be distributed between divisions in the ratio that the total payroll less salaries of \$2,400 and over per annum in each division bears to the total payroll less salaries of \$2,400 and over per annum in the whole corporation.

(b) The total value of bonus stock which may be awarded each year as junior bonuses shall be approximately from $1\frac{1}{2}$ per cent to 2 per cent of the amount of the earnings after deducting 6 per cent on the amount of capital employed in the business of the corporation.

3. Except with the approval of the president no employee shall be placed on the senior or junior bonus list unless he has been in the employ of the corporation at least one year.

4. "Royalty" bonuses may be allowed for inventions, suggestions or improvements which result in an annual monetary saving which can be ascertained with reasonable accuracy, the granting of which will be entirely irrespective of the corporation's earnings, each case being considered on its merits without regard to departmental lines or limits as to length of service.

The amount of each royalty bonus which may be allotted will be determined as a percentage of the actual value to the corporation for the first five years of utilization of an invention, idea or suggestion. For the purpose of consideration of the following paragraphs the term "invention" wherever used will be understood to refer to an invention (whether patentable or not), idea or suggestion.

The minimum percentage applied to the value of the ensuing five years' use of the invention for royalty bonus award, subject to the qualifications hereinafter named, is

established at $7\frac{1}{2}$ per cent and the maximum at 20 per cent, after deducting.

A—The cost to the corporation of the invention.

B—Six per cent for interest on the additional capital required for the invention's utilization;

C—Reasonable amortization or depreciation charge on equipment or buildings required.

It is obvious that the proper recognition by royalty bonus awards is bound to vary in different cases, depending on such factors as the condition under which the invention was envolved, originality of conception, the duties and opportunities of the recipient, etc. An employee paid to produce a result will not be entitled to participate in the royalty bonus, except for extraordinary or exceptional inventions.

The following percentages are suggested as meeting the equities and are to be observed as far as possible:

	Per cent
Base per cent to be allowed on invention.....	$12\frac{1}{2}$

Additions

For great originality	$2\frac{1}{2}$
When corporations will presumably enjoy exclusive use..	$2\frac{1}{2}$
When an invention is outside of the usual duty of the beneficiary	$2\frac{1}{2}$

Deductions

When an employee applies a well-known principle or practice	$2\frac{1}{2}$
When an employee is specifically employed to accomplish the result awarded	$2\frac{1}{2}$

FURTHER LIMITATIONS

The total award to date when allotting a royalty bonus to a single individual shall be at a maximum of 20 per cent up to \$50,000; not exceeding 10 per cent between \$50,000 and \$100,000; not exceeding 5 per cent up to \$200,000, which shall be the largest

amount allotted to any one individual for a single invention.

Awards royalty bonuses shall be made in three parts:

- 1st—There shall be awarded for the first year of the commercial use (based upon an actual service of at least six months) of an invention one-fifth of the then estimated total award, i.e., from $1\frac{1}{2}$ as a minimum to 4 per cent as a maximum of the estimated net saving to be realized by the corporation in the first five years of the utilization of the invention;
- 2nd—To be awarded two years after the first part and to amount to the difference between the first award and the net saving for the first two years at the rate established at the time of the first award; plus one-fifth of the estimated saving for the third year.
- 3rd—To be awarded at the end of the first five years of the utilization of an invention and to consist of the balance of the net saving during five years at the rate established at the time of the first award.

In case of difficulty arising in the computing of the actual value in any case, a first or second and a final award may be made in the discretion of the Bonus Committee.

5. Recommendations for junior and royalty bonuses shall be made as follows:

A—President's list—By the president for the consideration and final action by the Finance Committee in the case of heads of divisions and all salaried employees not under the jurisdiction of the head of a division, and individuals transferred to this class upon the recommendation of the head of a division with the approval of the president.

B—Division lists—By the heads of divisions to the Bonus Committee for final action in the case of employees recommended, with the same character of duties of each employee recommended, the amount of bonus, the reasons therefore, and the name of officials approving same.

6. Beneficiaries retired on a pension (should such a system be in effect) shall not forfeit any rights with respect to bonuses awarded.

7. After the annual meeting of stockholders in each year the president shall appoint a Bonus Committee, of

which he shall be ex-officio, a member, which committee shall be authorized and empowered to approve the senior bonus list positions, the junior bonus list and royalty bonus list, to make recommendations for bonuses, and to grant bonuses in all junior and royalty bonus cases.

8. In determining the number of shares in the bonus awards fractions of one-half or over shall be granted as a full share and less than one-half disregarded.

9. If it should become necessary, owing to business conditions, to temporarily release a number of employees, who, had they remained in the service of the corporation, would have been entitled to bonus awards and who it is expected will be re-instated within a reasonable period, that such employees may be recommended for bonus awards either senior or junior, covering the year in which they were released. These recommendations will be carried on a "reserve list," until such time (not exceeding one year from the date of employee's release) as it is definitely decided whether or not employee will be re-instated.

COMPANY STOCK AS A SERVICE BONUS

M. LOWENSTEIN & SONS, INC.,
NEW YORK CITY

One hundred thousand dollars of first preferred stock of M. Lowenstein & sons, Inc., New York City, converters and manufacturers of cotton goods, bearing dividends at the rate of 7 per cent a year, payable quarterly, were allotted on July 1st, 1920, to employees having three years' continuous service and others who, in the judgment of the company, merited reward.

This stock was deposited with the company's council, a trust for the benefit of employees within the class of July 1st, 1920. The idea was to give each participant a personal incentive "to continue the efficiency and loyalty



which the company appreciates and seeks to retain." The plan is as follows:

If the participant continues with the company until October 1st, 1922, the allotted stock will then be delivered and become the absolute property of the participant. In the meantime, the dividends declared from time to time will be paid quarterly, as the absolute property of the participant. The first dividend will be paid September 1st, 1920.

If any participant should die before October 1st, 1922 (being then in the company's service), the allotted shares of the deceased participant will be immediately delivered to the appointed beneficiary.

If any female participant shall marry before October 1st, 1922 (being then in the company's service), the allotted shares of said participant will immediately be delivered to her.

If any participant's connection with the company shall be severed before October 1st, 1922, such participant's interest shall immediately cease and endure (in proportion to their several holdings), to the benefit of the participants of July 1st, 1920, who remain with the company until October 1st, 1922.

In determining the amount to be allotted to each participant the officers took into consideration, length of service, position, advancement during service with company; ability, efficiency, salary and effort exerted to create success and benefit for the company.

A SERVICE BONUS AS A PRODUCTION INCENTIVE

BRAENDER RUBBER AND TIRE COMPANY,
RUTHERFORD, N.J.

After consideration of many plans for suitably rewarding employees who have continued in the service for a year or longer, the Braender Rubber and Tire Co. adopted a plan described below. The announcement to employees posted throughout the factory contained the following statement:

In placing the length of service plan in operation, the company shall expect the cooperation of all employees to insure its success and continuance so that next year and the years to follow the skill and loyalty that the company are capitalizing shall bring results in increased production and a lower proportionate operating expense.

You all know that as the cost of living has advanced, the company have increased wages and time-rates, and while this has been going on, *all* materials that enter into the manufacture of our goods have advanced in price which in some instances amount to more than 300 per cent, *yet the company are not receiving any more money for their product.*

Here then is where the company hope to recover for their outlay of the rewards for skill and loyalty.

VOLUME OF PRODUCTION

Each employee to bring every effort toward increasing their output; each day's work showing an advance over the previous day, so that every person's record for the week will be an improvement over the one before. Every one in this establishment can contribute toward this result, no matter what class of work they may be engaged in. Those working on calendar, mill, compounding, bead, press, inspection, wrapping, shipping, tire-making, heater, tube operations, office, sales, and in fact every unit in the entire organization can add something toward *volume of production*. Bear this important fact in mind: that a large production costs less in proportion than a small production, and if we can increase our output to the extent of each person doing his utmost, there will undoubtedly be justification for the company's outlay in their rewards for skill and loyalty and lower cost of production.

DECREASED OPERATING EXPENSE

Those operating machines can add to or lower operating cost according to their skill or lack of that quality. A careful and conscientious worker will run his machine as if it had been purchased by himself; he will avoid strain that would rip out gears, he knows when and how to favor it to get the best results and in studying these things he is keeping down the maintenance cost. The one who does not follow this course is doing something to defeat the aims

of the careful and conscientious person and therefore is blocking the company's efforts to reward skill and loyalty. Any saving that can be established in any direction will help to make the new plan a success. All this is worth your deepest study and means dollars to you as well as to the company.

PERCENTAGE SCHEDULE FOR 1919

One year, $2\frac{1}{2}$ per cent; 2 years, $3\frac{1}{2}$ per cent; 3 years, 5 per cent; 4 years, $7\frac{1}{2}$ per cent; 5 years, 10 per cent; 6 years, 11 per cent; 7 years, 12 per cent; 8 years, 13 per cent; 9 years, 14 per cent; 10 years, 15 per cent.

The above percentages will be paid January 15, 1920, on the amounts you have received during the fifty-two weeks covering above period. .

This is based upon continuous service and not intermittent, with the exception of those entering the service of the United States Government for military duty, also disability and sickness, in which event the elapsed time shall not count.

If at any time you remain away on account of disability or sickness, it will be necessary for you to notify the office by mail, in order to continue your benefits.

This plan is subject to change, revision or cancellation by the company and is not to be construed as a contract, but the company hopes to continue it indefinitely, which, however, will depend upon the cooperation of the employees.

LENGTH AND CHARACTER OF SERVICE DETERMINES BONUS

A "CREDIT SYSTEM" OF WAGE PAYMENT¹

CHICAGO MOTOR BUS COMPANY

A novel system of wage payments has been adopted by the Chicago Motor Bus Company, whereby each

¹ From Electric Railway Journal. 51 : 89-90. January 12, 1918.

employee's earnings are dependent upon a "rating" that is established by the length and the character of his services. The new plan, which has been called the "credit system" by its originator, Harold B. Weaver, vice-president of the company, applies to all drivers, conductors, starters, inspectors and others occupying comparable positions. Its application is effected by means of "credits" which are given for each month's service and entered upon each employee's record, certain "discounts" being deducted from the total in case the employee violates rules of the company. Older employees who, by their long service have acquired a very large total number of credits, participate to a certain extent in the company's earnings through "employees' dividends," these being declared as a percentage of the employees' annual earnings at the same percentage rate as is paid upon the company's stock.

CREDITS AND DISCOUNTS

There are three kinds of credits, as follows: regular credits, which are given for one month's service; extra credits, which are given for continued perfect service; bonus credits, which may be given in the discretion of the company for extraordinary services or on a competitive basis under prescribed conditions.

Regular credits are given at the rate of twenty-five for each month that an employee remains in the company's service, regardless of his capacity. Extra credits are given after any three consecutive calendar months of perfect service, that is to say, three calendar months during which no discounts have been imposed. Such employees receive five extra credits per month from the fourth to the ninth month (inclusive) of continued perfect service, and thereafter are given ten extra credits from the tenth to the twenty-first month (inclusive) subsequently being given fifteen extra credits per month so long as perfect service is continued. Bonus credits may be given at any time for extraordinary services or

unusually efficient work, upon the recommendation of a superior officer and with the approval of a board of employees of the same rank as the recipient.

In the case of violation of any of the rules, there shall be charged to the record of an employee a number of discounts ranging from one to fifty, according to a printed schedule of discounts. These discounts are imposed only by the heads of departments or general company officers, and their application cannot be remitted in case infractions of discipline have actually taken place. Neither can there be imposed any greater number of discounts than fifty for any particular offense.

The record of each employee's credits and discounts are kept by the company, and each employee has the right of access at any time to his own record, but not to the record of any other employee. The total number of credits obtained from all sources and total number of discounts imposed for all reasons are totaled at the end of each calendar month, and the total number of discounts subtracted from the total number of credits. The balance of credits represents the "rating" of each employee, and this rating is used as the means for determining his rate of wage and, subject to certain conditions, his right of preference as to work and promotion.

Whenever discounts are charged against the record of an employee, written notification is submitted to him, and in the event that an employee believes a charge of discount to be unjust or otherwise in error, he has the right of appeal by signing his name in the space provided on the notification for that purpose. Such appeals are heard before a board appointed by the president of the company from among officials equal or superior in rank to the one imposing the discount. Witnesses in such hearings may be called by either side, and these are paid their regular rate of wage for the time thus occupied.

EFFECT OF DISCONTINUANCE OF SERVICE

In the event that an employee resigns or is laid off through reduction of force, or if for any other reason not reflecting upon his record he leaves the service of the company, he is given a certificate of honorable discharge which shows his rating at the time. If he again enters the service of the company he starts to work with all of the credits that he possessed at the time he left the service and is entitled to whatever rate of compensation this rating brings.

In the event that an employee again enters the service of the company after he has been discharged for cause, he has to start on his duties without any credit whatsoever. Dishonorable discharge is brought about by a failure to perform work assigned to an employee, thus automatically forfeiting all credit acquired up to that time. Discharge is also brought about by the establishment, on an employee's record at the end of his first two months of service, of more discounts than credits. Also, any employee who has been with the company for a period in excess of four months and who for any period of three consecutive months averages less than fifteen credits per month, or for any period of six consecutive months averages less than eighteen credits per month, or for any period of one year averages less than twenty credits per month, is subject to discharge.

Demotion without discharge may be applied at the discretion of the company, but such demotions do not effect an employee's rating nor do they suspend his right to extra credits.

Credits continue to accrue to the benefit of an employee while on a regular vacation, but in case an employee obtains an extended leave of absence from work the accumulation of regular credits during the period of absence is in the discretion of the company, and extra credits for continuous good service do not accumulate.

EFFECT OF RATING ON WAGE

In the schedule of wages seven different classes are provided for, these differing from each other by increments of 1 cent per hour, each class including employees whose ratings, or net total of credits for each month have upper limits amounting respectively to 150, 300, 450, 600, 900, 1200 and 1500. The rates of wage applying to each one of these classes are more or less arbitrarily fixed and may be revised from time to time, the operation of the system being independent of the actual rates of pay by the various classes. Thus if the rate of wage for conductors in Class G (the lowest of the seven classes) is 26 cents, all conductors with ratings of less than 150 will get 26 cents per hour. When a conductor accumulates more than 150 credits he moves up into Class F and is paid 27 cents per hour.

For employees having ratings that are in excess of fifteen hundred credits, there are provided five grades, and these employees, in addition to class A wages, participate in the company's earnings through an "employees' dividend." This is declared at a rate which, if possible, is to be equal to the dividend declared on the stock of the company for the same period, but in no case is the employees' dividend to be less than at the rate of 3 per cent per annum. This dividend is to be based on the total amount of money paid during the period involved, as wages to each of the employees participating in the dividend.

All employees in the five grades that have, during the period covered, earned an average of not less than twenty credits per month are to be entitled to participate in this dividend. Each of those in the lowest grade is entitled to an amount equal to the declared percentage applied to his total earnings during the period covered. For each employee in the next higher grade, the amount of the dividend is based on the same percentage as in the lowest grade, but this percentage

is applied to twice his total earnings during the period covered. For the three higher grades the amount is based respectively on three times, four times and five times the employees' total earnings during the period covered. Thus, if employees' dividend is 6 per cent, the employees in the highest grade receive bonuses equal to 30 per cent of their earnings during the previous year.

In general, it may be said that this system permits employees to enjoy an income which increases over a long period of time and is an inducement for them to remain in the service of the company. Long service not only produces individually efficient work, but also efficiency of the all-important character that cooperates with other members of the organization and is thus of special value to the company. The company recognizes that each employee who remains in its service has, in a sense, an investment value in the company. This is the investment of years of service which, except for general experience gleaned, is of no value to him in the service of another company. Naturally, such a principle points to an eventual participation in earnings by employees, but inasmuch as it is continuous service that is of value to the company, and since it is continuous service alone that is an investment by the employee, any participation must be purchased not with money but with time. In brief, the right to participate in earnings does not accrue to an employee who has not earned this privilege by a certain length and character of service.

SERVICE AND SALARY DETERMINE BONUS

WHITE SEWING MACHINE COMPANY CLEVELAND, OHIO

For continuous service of five years or more, 10 per cent in addition to regular wages.

For continuous service of four to five years, 8 per cent in addition to regular wages.

For continuous service of three to four years, 7 per cent in addition to regular wages.

For continuous service of two to three years, 6 per cent in addition to regular wages.

For continuous service of one to two years, 5 per cent in addition to regular wages.

For continuous service of six months to one year, 4 per cent in addition to regular wages.

RULES GOVERNING PAYMENT

1. Bonuses or extra wages will be paid four times per year. The year will be divided into four parts, to be called bonus periods. These bonus periods will end with the last regular pay in March, June, September and December.

2. The amount of bonus for every employee will be figured on the total regular wages he has earned during each bonus period.

3. No bonus will be paid for less than a whole period.

4. Lump sum payments of bonus money will be made on the second Wednesday following the end of a bonus period.

5. Every factory day- and piece-worker who has been continuously in the service of the company for five years or more at the end of a bonus period will be paid a sum equal to 10 per cent of the total regular wages he has received during that bonus period.

6. Every factory day- and piece-worker who has been continuously in the service of the company at the end of a bonus period of four year but less than five years, will be paid a sum equal to 8 per cent of the regular wages he has received during that bonus period.

7. Every factory day- and piece-worker who has been continuously in the service of the company at the end of a bonus period for three years but less than four years, will be paid a sum equal to 7 per cent of the total regular wages he has received during that bonus period.

8. Every factory day- and piece-worker who has been continuously in the service of the company at the end of a bonus period for two years but less than three years, will be paid a sum equal to 6 per cent of the total regular wages he has received during that bonus period.

9. Every factory day- and piece-worker who has been continuously in the service of the company at the end of a bonus period for one year but less than two years, will be paid a sum equal to 5 per cent of the total regular wages he has received during that bonus period.

10. Every factory day- and piece-worker who has been continuously in the service of the company at the end of a bonus period for six months but less than one years, will be paid a sum equal to 4 per cent of the total regular wages he has received during that bonus period.

11. In the future an employee laid off because of lack of work will be paid immediately a bonus on the wages he has received since the last bonus settlement, on the same terms as if he had completed the bonus period. If employed again within a year from date of lay-off he will be given full credit for length of former service.

12. An employee who leaves of his own accord, or an employee who is discharged for cause, will not be paid any bonus on the wages he has earned since the last bonus settlement. If again employed he will not be given credit for former service.

13. Loss of time by reason of sickness or accident will not be considered as an interruption of service.

2. VESTA ACCUMULATOR COMPANY, CHICAGO

The experience of this company in establishing its plan will be of value to readers. The first attempt of the company consisted of paying to each employee, as a Christmas gift, a fixed sum, regardless of length of service or wages earned, the amount so paid being gov-

earned by the amount of net earnings of the company during the year. This was unsatisfactory for several reasons, and in one instance, when the net earnings were quite small, the amount allotted to each employee was so slight that it was received with more or less open contempt.

The company next instituted a method of distribution based on length of service, dividing the same into three period—i.e. over three months and less than six; over six months and less than a year; and over a year. This was a step in the right direction, but was still faulty in that it did not differentiate between the high salaried employee and the day laborer.

The plan was then devised of distributing the bonuses based upon length of service and total amount wages received during the year, working it out in the following manner:

Less than one year's service.	1 per cent of total yearly wages
One to two years' service.	2 per cent of total yearly wages
Two to three years' service.	3 per cent of total yearly wages
Three to four years' service.	4 per cent of total yearly wages
Four to five years' service.	5 per cent of total yearly wages
Five to six years' service.	6 per cent of total yearly wages
Six to seven years' service.	7 per cent of total yearly wages
Seven to eight years' service.	8 per cent of total yearly wages
Eight to nine years' service.	9 per cent of total yearly wages
Over nine years' service.	10 per cent of total yearly wages

3. NEW ENGLAND MACHINE SHOP

A machine shop in one of the New England states pays the following bonuses to employees for service and for "loyalty rendered the company".

	Per cent of wages
Service of one year and under	 4 per cent
One year and under three	 6 per cent
Three years and under five	 8 per cent
Five years and over	 10 per cent

These percentages are computed on total wages or salaries earned for the period of one year.

4. BRIGHTON MILLS, PASSAIC, N. J.

The following plan of the Brighton Mills, Passaic, N.J., which employs about eighteen hundred.

The "annual continuous service reward" follows:

First year	5 per cent	Sixth year ...	12 per cent
Second year ..	8 per cent	Seventh year .	13 per cent
Third year ..	9 per cent	Eight year ...	14 per cent
Fourth year ..	10 per cent	Ninth year ...	15 per cent
Fifth year ...	11 per cent	Tenth year ...	10 per cent

Mills payroll at the end of each year of continuous service, commencing with the first year.

SERVICE BUTTON

In addition to this a celluloid button will be given to those who have been in service one year.

A bronze button will be given to those who have been in the service from two to five years.

A silver button will be given to those who have been in the service from five to ten years, and a gold button will be given to those who have been in the service ten years or more."

Executives are paid commissions based on earnings of the company.

5. INTERNATIONAL SILVER COMPANY,
MERIDEN, CONNECTICUT

The following plan covers the four thousand employed in the fifteen plants of the International Silver Company, Meriden, Connecticut. All employees who have been with the company five years or more, except salaried workers are included. The bonus is paid annually and consists of 5 per cent of the yearly earnings of the company. Foremen as well as salaried workers are not included in the plan which replaces the previous attendance bonus to which foremen were eligible. The new plan was established December 15, 1921.

6. ALEXANDER SMITH AND SONS,
YONKERS, N. Y.

Since 1921 this company has given its employees a bonus of a percentage of their earnings for a six months'

period. The percentage is changed from time to time, the usual being 5 per cent for one year, 6 for two years, and so on up to 15 per cent for eleven years and over.

For the six month period ending December 31, payment is made on the following February 1, and for the six month period ending June 30, payment is made on the following August 1.

7. A MIDDLE WEST MANUFACTURING CONCERN

The plan of this company provides the following bonuses based on amount of wages:

Service of one year and under.....	4 per cent
One year and under three.....	6 per cent
Three years and under five.....	8 per cent
Five years and over.....	10 per cent

8. GENERAL ELECTRIC COMPANY, WEST LYNN, MASSACHUSETTS

After continuous service of five years employees receive a semi-annual bonus at the rate of 5 per cent per annum on their actual earnings. This is not permanent, but is determined each six months by the officers of the company depending on conditions of business. So far it has been paid each half year since about 1915.

9. HERCULES POWDER COMPANY, WILMINGTON, DELAWARE

The plan is called a "merit bonus plan" and makes the following provisions:

After two years' service 5 per cent of average monthly earnings.

After five years' service 10 per cent of average monthly earnings.

After fifteen years' service 20 per cent of average monthly earnings.

10. FOURTH NATIONAL BANK, ATLANTA, GEORGIA

This bank, in 1920, paid a bonus of 6 per cent of annual salaries to employees of less than one year's

service, 7 per cent to those of one year, and so on up to 14 per cent for eight years. Officers received 25 per cent.

In 1921 this scale was changed to 4 per cent for those of less than one year's service, up to 10 per cent for six years, and 10 per cent for officers.

SERVICE, SALARY AND COMMON STOCK DIVIDEND RATE DETERMINE BONUS

A LARGE MANUFACTURING CONCERN

A prominent manufacturing concern which employs between five hundred and one thousand has the following plan which has been in successful operation since 1917. "This plan," says the company, "is intended to secure intensified cooperation and better services through a relationship which though conditional upon personal merit, loyalty and length of service rather than upon the earnings of the company, resembles somewhat a copartnership between the stockholders and employees."

The amount of compensation payable is dependent upon length of service, regular annual salary and the rate of dividends paid upon the common stock of the company and is payable on the quarterly dividend dates.

A committee consisting of the assistant secretary of the company, the superintendent, and the office manager were appointed by the president to handle administrative questions concerning the operation of the plan.

REGULATIONS

1. Under the plan the employee's regular annual salary after the first year of employment is considered capital on which the additional compensation is based.
2. The qualifications under the plan are:
 - (1) The employee must render loyal and efficient service.

- (2) The plan applies to all employees who are on a salary basis, but excludes all who participate in any commission, piece-work or task and bonus basis.
- (3) The employee must have been continuously in the direct employ of Pyrene Manufacturing Company for at least one year on a salary basis, and must also have been on a salary basis during the whole period for which the additional compensation is paid.

3. For the purpose of the plan the extent to which the employee's salary is considered as capital, in other words his "capitalization," shall be the amount of his annual salary rate which is in effect on his "anniversary date," that is, the quarterly dividend date following his last full year of employment.

Example A. John Smith enters the employ of the company on January 15th, 1918. On February 1st, 1919, he completes one full year of service during which time he has received various increases in salary. On February 1st, 1919, his salary is at the rate of \$800 a year. His "capitalization" is therefore \$800.

This capitalization is increased for each year of service by adding to the last annual salary rate 10 per cent thereof for each full year of employment after the first year, but not more than ten years. Such increase of capitalization takes effect even though there may have been no increase in salary.

Example B. William Jones entered the employ of the company on March 12th, 1915. He therefore completes four years of service on May 1st, 1919, on which date his salary is \$1,200. To this is to be added 10 per cent for each of the last three years, or 30 per cent of \$1,200, making a total capitalization of \$1,560.

The capitalization, therefore, can never exceed twice the amount of an employee's salary as it exists on his last anniversary date.

4. Until further notice the rate of compensation shall be as follows:

Whenever a quarterly cash dividend in excess of $1\frac{1}{2}$ per cent is declared and paid on the then outstanding common stock of the company (i.e., at the rate of 6 per cent per annum) each employee entitled thereto shall receive a percentage on his capitalization equal to the excess of such cash dividend over $1\frac{1}{2}$ per cent. Such additional compensation shall be paid in quarterly installments on February 1, May 1, August 1 and November 1, for the three preceding months.

Example C. On August 1, 1919, the company declared and paid a quarterly dividend of $2\frac{1}{2}$ per cent. If on May 1, 1919, William Jones' capitalization was \$1,560, on August 1 he receives a check for 1 per cent on his capitalization, or \$15.60.

5. No additional compensation shall be paid for any part of the first year's employment or for any fraction of any quarterly period.

6. An employee who enlisted or who was drafted into the military service of the United States or any of its Allies, does not lose his standing with regard to length of service, and should he be reemployed by the company immediately after his discharge, he receives full credit for the period of his absence in computing his capitalization.

7. Discontinuance or termination of employment by either the employee or the company, with or without cause, and for whatsoever reason, shall forthwith operate as a forfeiture to the company of any unpaid additional compensation or salary. Should any employee be reemployed at a later date the length of service shall date from the date of re-employment.

8. The president of the committee or the committee, shall, from time to time, in his or their sole discretion,

determine the qualifications of employees under the plan, and the amount of, and the time and manner of making payments under the plan. Neither the plan nor these regulations shall be construed as giving any employee any interest in the capital or assets of the company under any conditions whatsoever, but only in the current profits of the company, subject to the terms and conditions herein set forth, and conditioned upon the favorable determination by the president or the committee of such employee's loyalty, efficiency and other qualifications. The president or the committee shall have power, from time to time, and with or without notice, to construe, modify and amend these regulations, and to issue new or additional regulations. The Board of Directors of the company may, with or without notice, rescind the plan and the regulations then existing. The committee shall decide all questions concerning the operation of the plan, subject only to review by the president. Whose decision shall be final.

PROFIT-SHARING AS A SERVICE BONUS ¹

1. HIBBARD, SPENCER, BARTLETT AND COMPANY, CHICAGO

This plan was adopted by the stockholders January 18, 1921, and became effective as of January 1, 1921. The time of operation has been too short for the company to say whether or not the plan will prove successful, but subscribers will be interested in the details of the plan. For several years before this plan was adopted, the company had a profit-sharing plan based on length of service, but that did not prove successful and it was abandoned.

The company has a plan for stock distribution whereby employees whose terms of service have been three years

¹ Other profit-sharing plans containing service bonus features will be found under the section "Profit-Sharing."

are permitted to buy an amount of stock not exceeding ten shares. Liberal assistance is given such employees in paying for the stock in instalments.

THE PLAN

1. Hibbard, Spencer, Bartlett and company will set apart for the stockholders out of its earnings for 1921, and annually thereafter, an amount equaling 8 per cent of the invested capital, according to its book value.

2. The profits in excess of the percentage so set aside for the stockholders will be divided equally, as hereinafter provided, between the stockholders and employees.

3. The profits to be divided under this plan shall be only those arising from the purchase and sale of merchandise and shall not include profits which may accrue from the ownership of other assets, such, for illustration, as lands and buildings.

4. All employees in continuous service for a calendar year or more, including officers and stockholders, but excluding country traveling salesmen, to share in profits in proportion to salaries paid them. In calculating salaries, commissions, premiums and piece-rate bonuses to be included, but payment for overtime work to be excluded.

5. The distribution of profits to employees will be made during the month of May, following the closing of the books for the year, to those still in the service of the corporation.

6. If an employee leaves or is discharged during the year, or before the distribution of profits in the month of May following, he forfeits any share in the distribution; except that if an employee dies or is pensioned, his share will be paid to him or his estate.

7. A temporary discontinuance of employment, through special leave of absence, sickness or accident disability, will not, for the purpose of this plan, be considered a break in the continuous service of an employee.

8. It should be understood that nothing in this plan

shall bind any employee to remain for any period in the employ of the company, nor shall it bind the company to retain any employee in its service for any period. The right of each employee to leave the service of the company for any reason, and the right of the company to terminate for any reason the service of any employee, shall remain unaffected by this plan or by any thing done under it.

9. It is the intention of the company to continue this plan permanently, but it reserves the right to change or terminate the plan at the end of any calendar year; provided that notice of such decision shall be given not later than the first day of the month of February following.

10. The Board of Directors of the company shall have charge of the operation of this plan. It shall have power to interpret the provisions of the plan and exercise such discretion and make such decisions as are necessary to the proper operation of the plan. The board shall have power to prescribe rules and regulations for the effective operation of the plan. All orders and decisions of the said board shall be final, conclusive and binding upon all parties.

2. CHICAGO TRUST COMPANY

The following plan for additional compensation for officers and employees of the Chicago Trust Company has been in operation since January 1, 1920.

1. An amount equal to $3\frac{1}{2}$ per cent of the net earnings for the year shall be set aside for distribution to employees (not officers).

a. The net earnings shall be so much of the gross earnings, receipts, and credits of the bank's business for the year as shall remain after deducting all expenses incurred in the conduct of the business, including taxes, interest, and other charges, and all losses, depreciations, charge-offs, or reserves created for any purpose, as entered upon the books of the bank for the year, but

before payment of dividends. The determination of such net earnings by the Board of Directors shall be final.

2. After deducting from such net earnings the amount set aside in Paragraph 1 and in addition an amount equal to 8 per cent of the stockholder's interest in the bank, as determined by the average amount of capital, surplus, and undivided profits shown on the books at the end of each month during the year, a further sum shall be set aside equal to one-fifth of the net earnings as so reduced. This fund shall be distributed as follows:

Forty per cent among employees (not officers).

Forty per cent among senior officers, chiefly responsible for the production of business and the conservation and management of the bank.

Twenty per cent among other officers.

The classification of officers shall be made by the Board of Directors at or about the beginning of each calendar year.

3. The distribution of both the employees' funds and the officers' funds shall be on the following basis:

Fifty per cent of the fund of each group shall be distributed to the individual on the basis of the ratio of the individual salary to the total salary in the group.

Thirty per cent of the fund of each group shall be distributed on the basis of the ratio of current yearly salary of the individual multiplied by years of service, not exceeding ten years, to the total of yearly salaries multiplied by years of service.

Twenty per cent of the fund of each group, comprising a special service fund, shall be distributed by the Board of Directors on the recommendation of the president to those individuals who have rendered special meritorious service during the year.

RULES GOVERNING ADDITIONAL COMPENSATION

1. Plan applies only to officers and employees of the bank.
 - a. Who are in the regular employ of the bank.
 - b. Who are in the employ of the bank for not less than one year.

- c. Who do not participate in some other form of additional compensation beyond their regular salary, such as commissions and special contracts.

It is hoped that as rapidly as any existing arrangements expire the entire staff of the bank will be on a uniform basis.

2. The bank reserves the right, before the commencement of any calendar year, through its Board of Directors, to modify this additional compensation plan in any respect, or to discontinue it.

3. The bank reserves the right, through its Board of Directors, to exclude from the benefits of this plan any officers or employees, the character of whose work shall not have been satisfactory, or who shall have been employed for special purposes.

4. Any officer or employee who from any cause shall not be in the service of the bank at the end of any calendar year shall have no right to a share of such additional compensation for such year unless the Board of Directors shall otherwise determine.

5. For all years other than the current calendar year, a fraction of a year in excess of six months shall count as a full year.

6. This plan replaces any existing plans of bonus or additional compensation employed in the past, except where contract exists.

7. The designation of senior officers in the year 1920 shall be as follows:—

The President.

Vice-Presidents.

Manager of the Bond Department.

Managers of the Real Estate Loan Department.

Manager of the Trust Department.

Cashier.

8. The designation of junior officers in the year 1920 shall be as follows:

Trust Officer.

Assistant Cashiers.

Assistant Manager of Trust Department.

Assistant Manager of Real Estate Loan Department.

Auditor.

